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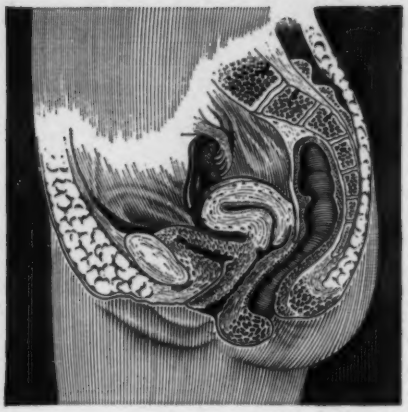

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1. Gardner, L. I., Butler, A. M., et al.: *Pediatrics* 5:228, 1950.
2. Nesbit, H. T.: *Texas State J. M.* 38:551, 1943.
3. Dodd, K., and Rapoport, S.: *Am. J. Dis. Children* 78:537, 1949.
4. Recommended Daily Dietary Allowances, Revised 1948, Food and Nutrition Board, National Research Council.

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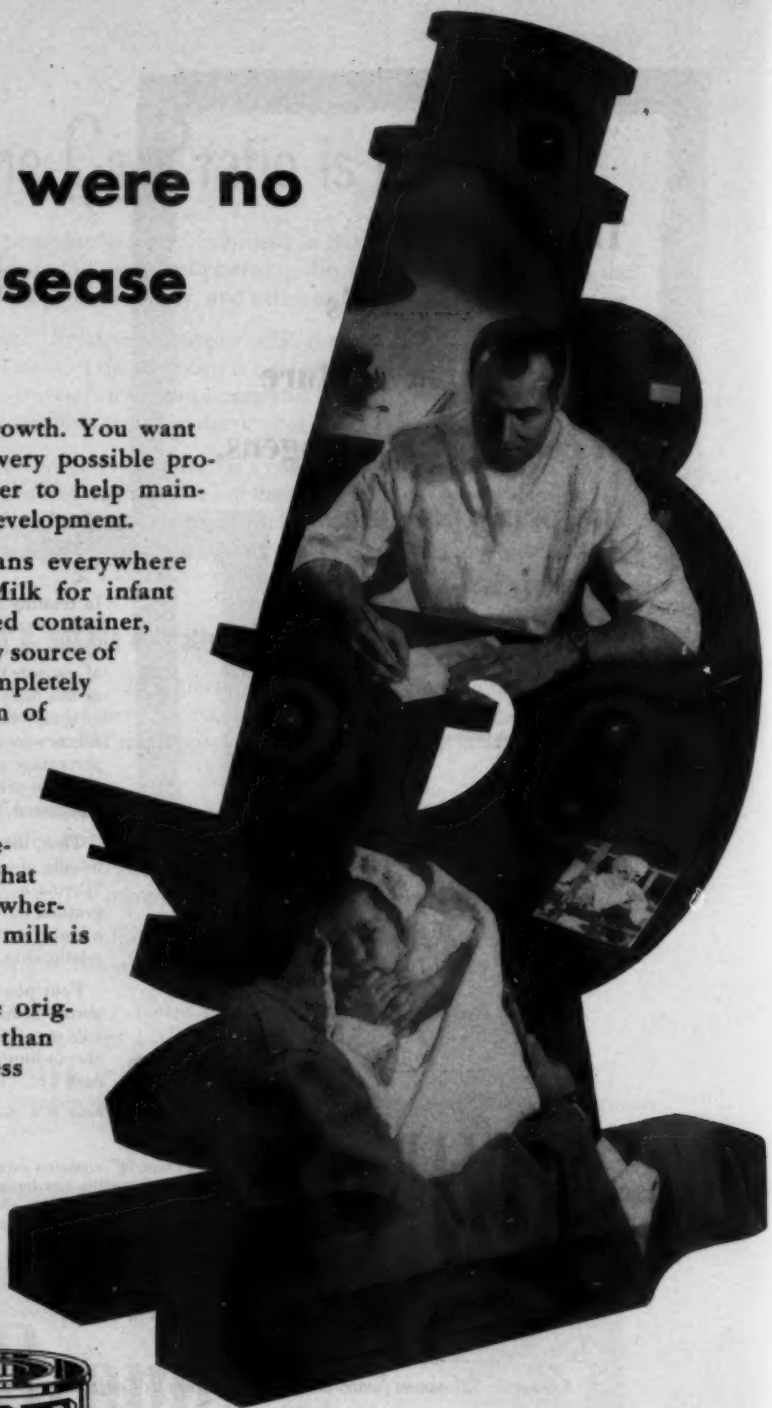

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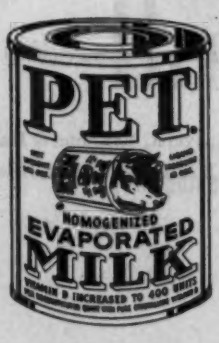

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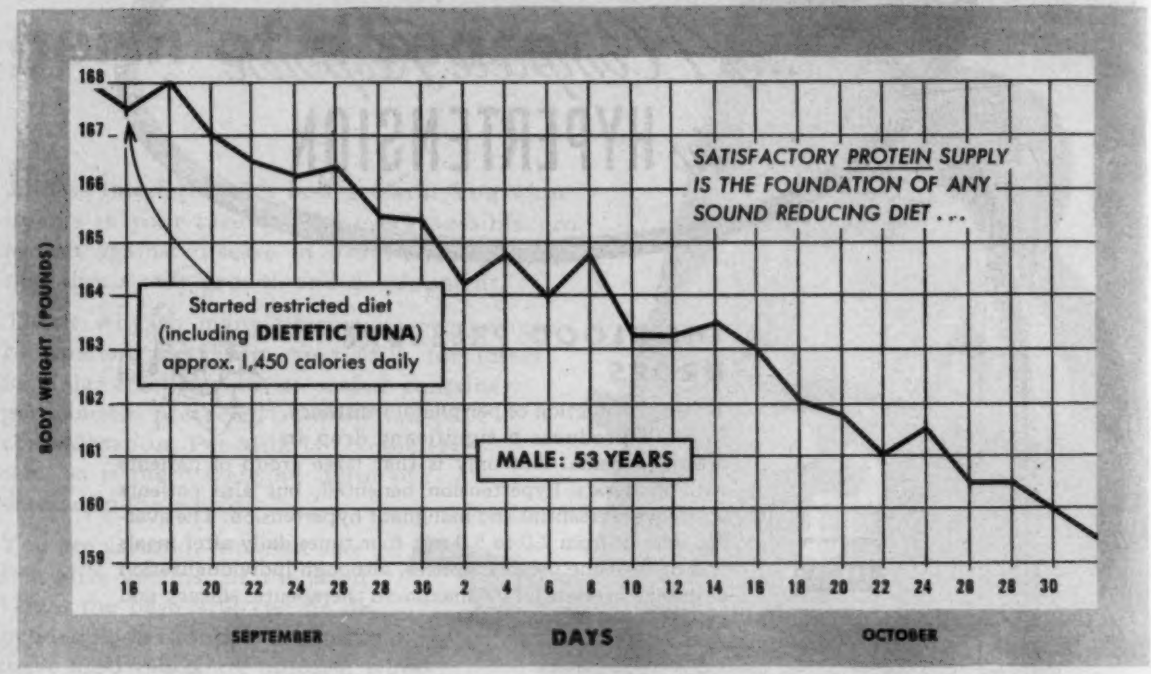

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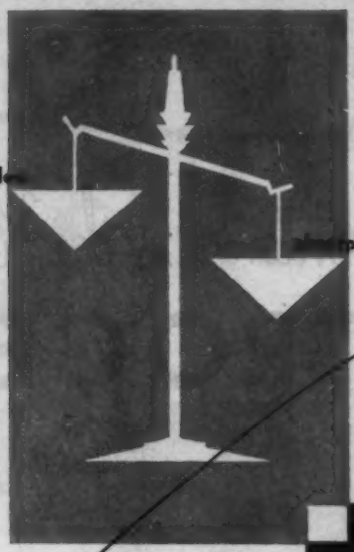

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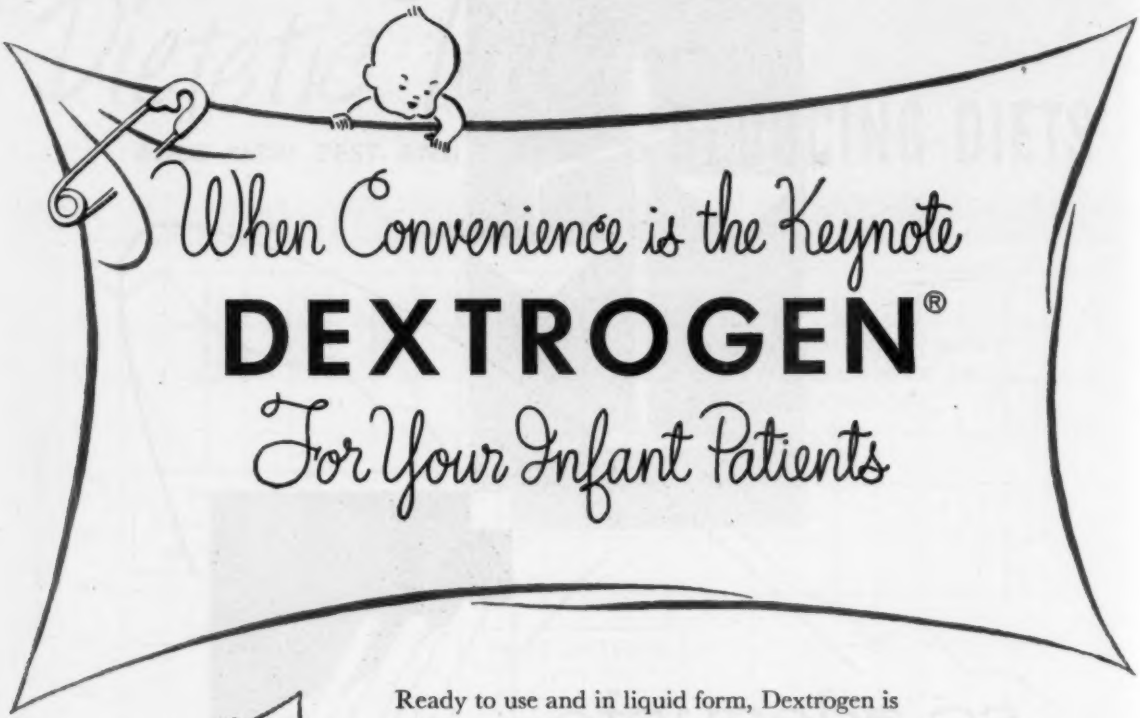

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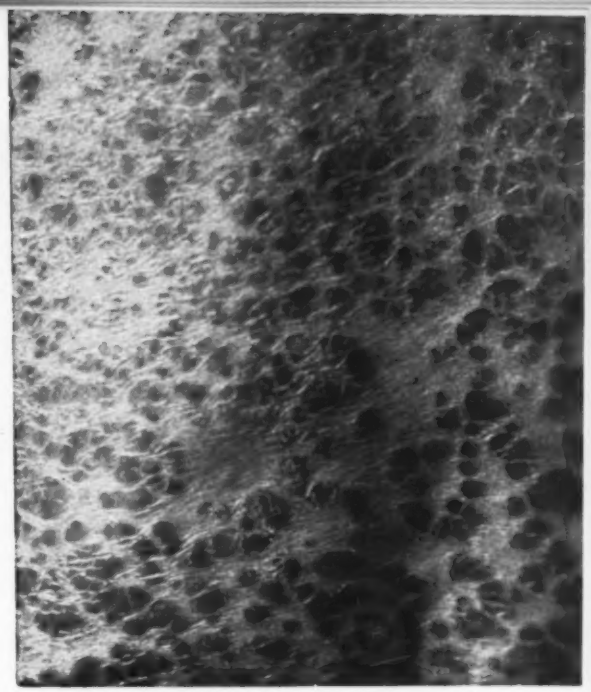

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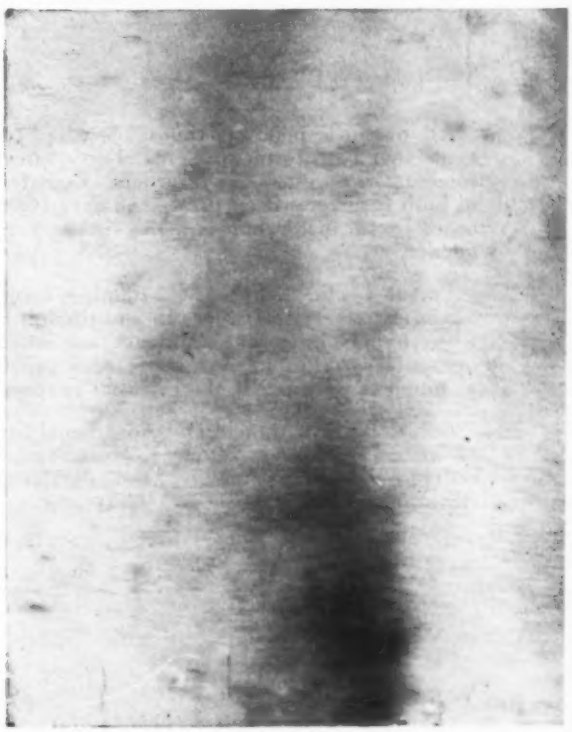

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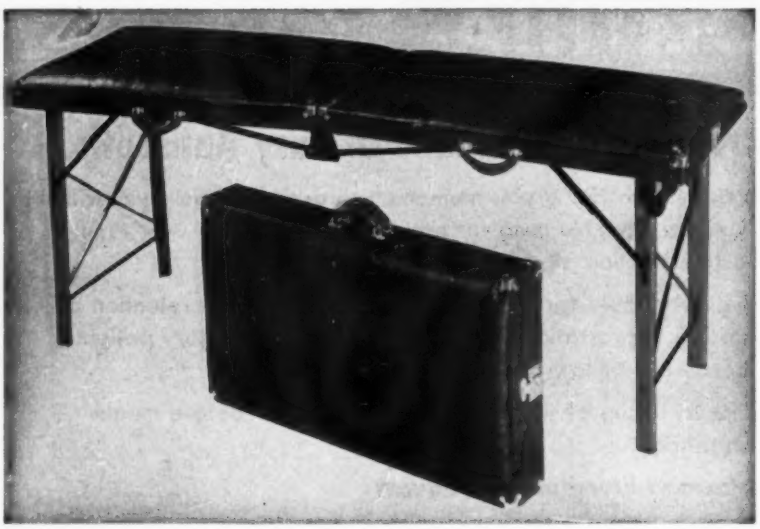

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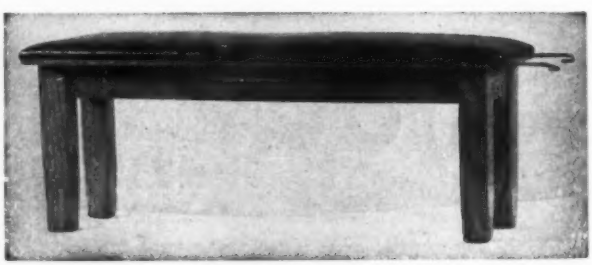

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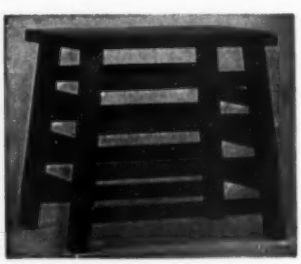

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The Journal of the American Osteopathic Association

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Structural Mechanics of the Lumbar Spine and Pelvis*

ANGUS G. CATHIE, D.O.

Professor of Anatomy
Philadelphia College of Osteopathy
Philadelphia

Regardless of which part of the spine is under consideration, certain basic facts must be kept in mind:

1. The anatomy of the various parts is not static. The various tissues of the body are continually undergoing change.

2. The growing or developing structure is more plastic than is the fully developed one and, because of this, adaptive changes take place more readily.

3. Although the term "normal" is used, there are so many variations of structure within the range of normal limits that "average" may be a less dangerous term to use.

4. The various systems of the body are closely related and respond to physical, mental, and emotional tensions. Evidence of this is often found in the spine.

5. Peculiarities of structure and the relationship of the systems of the body result in individual differences.

The success of our efforts directed toward the care of the human body can not go beyond our knowledge of its structure and function. The difficulties encountered in gaining adequate knowledge concerning them and the almost equal difficulties experienced in appreciating its significance have led many to underestimate and even discredit what has been called the osteopathic concept and principles. Physical principles and the laws of mechanics are well illustrated in the human body, and it is from knowledge of these that the osteopathic profession obtained its start. Full appreciation of these facts can perhaps never be reached, but we should be coming nearer to this full appreciation than we have to date.

I presuppose the reader's knowledge of the general architectural characteristics of the low back and pelvis and therefore will devote this paper to important facts concerning development, special structural features, relationship of parts, and the importance of variations of value in the study and care of problems related to the low back and pelvis.

DEVELOPMENT

The pelvis and lumbar regions of the spine undergo great changes in shape, position, and function during the period extending from birth until the upright position is assumed and locomotion established. From then on, the changes are more gradual until adult structure is attained. During this early period, functional trauma with its associated compressive, tensile, and torsional forces produces architectural alterations of great importance to the future well-being of the individual.

The lumbar curve begins about the age of 1 year, at the time when the lower extremities are straightened out, the ability to assume the sitting posture has been acquired, and the ability to walk unaided has been accomplished. Coincident with these changes, and until the age of 6 or 7, the pelvis enlarges rapidly until its cavity is of sufficient size to accommodate most of the pelvic viscera. With the appearance of the lumbar curve, anterior tilting of the pelvis takes place and the two factors cause the formation of the lumbosacral or sacrovertebral angle. Functional demands of greater muscular activity—so marked after the third year when running and jumping are added to ordinary locomotion—are accompanied by a deepening of the acetabulum for better reception of the femoral head and further widening of the pelvis.

It is unfortunate that, although the facts presented above have long been recognized, their significance has been overlooked. The result has been that damage which could have been avoided has taken place and that some reparable damage has been permitted to remain and progress, resulting in irreparable damage in later years.

The significance of the peculiarities of growth and development should be appreciated in the interests of prevention as well as cure. It should be realized that these changes are taking place at a time when adaptive deformities are most easily acquired due to the biological as well as the physical plasticity of structures in the process of formation. It is at this time that the spinal pattern of later years is being established. The need for proper nutrition, combined with the correct reception and delivery of forces, is great at this time. Further, it should be kept in mind that growth and development should not be painful processes. The slightest complaint of fatigue, discomfort, or actual pain in growing structures should receive the benefit of careful investigation.

The mechanics of the acquisition of the lumbar curve has been explained above. The extent and subsequent changes of this curve need further explana-

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tion. Until puberty, the spinal curves pass almost imperceptibly from one to another so that the proximal limit of the lumbar curve of the child cannot be defined. In the adult, the extent of the lumbar curve is from the middle of the twelfth dorsal segment to the lumbosacral junction. Some individual variations exist but, regardless of these, the normal spinal curves should be such that articular surfaces of the vertebral bodies should receive most of the weight or compressive forces of the column. Such transmission of gravitational forces through the spine is accomplished without strain being placed on the spinal muscles and ligaments. In this position, the lumbosacral joint lies vertically under the craniospinal (atlanto-occipital) articulation. Although subject to considerable debate, we may safely consider the mid-gravitational line of the body as passing through the body of the third lumbar segment to the middle third of the sacral base. From the sacral base, the distribution of weight passes by way of the sacrofemoral arch to the upper portion of the femoral heads. Examination of the line of this arch on the innominate bone reveals an area of bone density greater than that found in adjoining areas.

The lumbar region of the spine is placed between two areas of greater stability or resistance—the dorsal region proximally and the sacral region distally. These junctions are transitional in structure, curvature, and in degree and type of motion. The lumbar curve is an acquired or secondary one that appears after birth and disappears before death in the individual living until old age.

SPECIAL STRUCTURAL CHARACTERISTICS OF LUMBAR VERTEBRAE

The general or gross characteristics of the lumbar vertebrae are well known so that only certain special features that are not universally appreciated will be mentioned.

The fifth lumbar vertebra is the one that differs from the others in this region: (1) Its body is wedge-shaped—a fact that contributes to the formation of the lumbosacral angle. (2) Its pedicles or roots are short and broad, being re-enforced laterally by the transverse processes. (3) The transverse processes arise from the superolateral portion of the body running parallel to, and blended with, the pedicle or root. (4) Because of this relationship of parts, the length of the so-called intervertebral foramen—more correctly a canal—is equal to the combined width of the pedicle and transverse process. The shortness of the pedicle results in the placement of the lumbosacral arthrodial joint relatively close to the body, with the result that the canal is narrow. Although the fifth lumbar nerve is the largest, it passes through the smallest intervertebral foramen or canal of the lumbar region. (5) The superior articular processes are widely separated and (6) the inferior processes are almost as widely separated so that they lie in nearly the same vertical plane as the superior. (7) The spinous process is curved downward so that its termination is on the same level as the inferior border of the body of the segment. (8) The facet spacing is subject to the greatest variation because of the variations of facet facing, but the average facet facing is in a modified sagittal plane.

The following general statements may be made concerning the function of the gross parts of a vertebral segment and applied in a degree to the region of the spine under consideration.

The *body* functions as the chief axis of support. The bodies form the anterior pillar.

The *neural arches* protect the spinal cord and assist in the formation of foramina for the passage of the spinal nerves and associated vessels.

The *spinous* and *transverse processes* are levers to which muscles and ligaments attach.

The *articular processes* are the supporting points of the posterior pillar of the spine. They permit motion, control its direction, and assist in the limitation of its range. In the lumbar region the articular facets are larger and deeper, so that more force is required to cause injury here than in other spinal areas. However, since this region is subject to more frequent and severe stress and strain than others, lesions are found here as frequently as in the other spinal areas.

The pars interarticularis, a weak point in the lumbar vertebrae of man, is not described in most textbooks of anatomy. Roberts[1] in his "Chronic Structural Low Backache" gives the best description of this part. The pars interarticularis is the pivotal point of the neural arch and in the vertical plane is located between the superior and inferior articular processes. In the anteroposterior plane it is located between the pedicle or root and the lamina. It lies medial to the base of the transverse process in the horizontal plane, which places it on the lateral aspect of the neural or vertebral canal. At the time of birth, this area is cartilaginous and does not undergo ossification as soon as do closely related parts of the neural arch. Arteries enter this area from both external and neural sides and, having gained entrance, branch to pass in several directions. The vessels of the area have been described as having a "sinusoidal arrangement."

The weakness of the vertebral segment at this point is found only in man—the one animal to have adopted the upright position and the only one to have a lumbar curve. At the time the child stands and begins to walk, there is development of the lumbar curve as has been previously described; additional strain is placed on this weak pivotal point at a period when its development is not complete. The part of the vertebral segment anterior to the pars interarticularis may tend to bend downward altering the vertebral mechanics. Diagnosis of this lesion can be made through careful history, physical examination, and x-ray studies. This defect is said to be detected most easily in oblique film studies.

The pars interarticularis should not be considered as an osseous defect but as a weak part which, when not properly ossified or if traumatized before development is complete, is a potential area of danger. Many patients with low-back pain are found to have injury in this area.

ANOMALIES OF LUMBAR AND SACRAL AREAS

It will be impossible to enter into a complete discussion of the variations of congenital origin or of the numerous anomalies found in the lumbar and sacral areas of the spine. Such conditions are found more frequently in these than in the cervical and dorsal regions.

Some anomalies have received much attention, notably, gross absence of parts of the neural arch producing spina bifida and sacralization. Minor defects and anomalies, however, have been given less consideration or, in some instances, almost none. Most of us are familiar with the casual dismissal of many of them as being "of no clinical significance."

A few years ago my attention was drawn to the frequency with which some of these so-called "minor defects" were found in young adults complaining of

discomfort or pain of varying degrees in the low back. Minor degrees of spina bifida, atypical and/or asymmetrical facet facing, and infantile characteristics of articular processes were found in several. Unleveling of the sacral base due to anatomical shortening of the femur should be included since it frequently results in the production of low-back pain.

So long as the posture is good, these "minor defects" do not produce symptoms, but after some postural change has taken place, they become exceedingly important etiological factors in the production of symptoms which are often complicated. Prior to the onset of symptoms, the importance lies in the fact that these areas of deficiencies are both actual and potential *sites* of difficulty. They are actual in the sense of being areas of deficiency at sites of ligamentous and muscular attachment, which are not capable of fulfilling the requirements placed upon them by the forces coincident with physiological trauma of daily life. They are potential in that they are capable of producing symptoms due to the inadequate attachment for the related soft parts, with resulting imperfection of mechanical activity. In other words, the defect does not produce the symptoms but, because of the defect, the periarticular soft parts are more likely to be called upon to compensate for the osseous defect. There may for some time be no roentgen evidence of articular or periarticular strain of these radiologically less dense structures, but its absence should not exclude consideration of existing physical change.

Spina bifida indicates a lack of firm attachment for posteriorly placed muscles and ligaments, imperfection in a posterior lever. Irregularity of facet facing indicates inequality of articular motion, and incompletely developed articular processes indicate varying degrees of deficiency in weight transmission and regulation of direction and motion. Abnormal strain placed upon postural ligaments and muscles is often seen as a direct result of many of these so-called "minor defects of no clinical significance."

Variations of bodily habitus are familiar to every one. There is also some variation in spinal mechanics that is due to variation in structure of bodily types. Such variation is seen in the articular process of the lumbar region. In the long linear type the articular facets are flatter, resulting in a greater range of motion. In the brevilinear or short thick type the facets are larger and more crescentric, resulting in a more restricted range of motion. It should be kept in mind that, regardless of bodily habitus, variations in the symmetry of facet facings are common. The significance of this is that the motion permitted must vary on the two sides so that inequality of motion due to anatomical variation should receive consideration. The relationship between these differences in structure and lumbosacral strain are obvious.

Deformities and some of the variations do not, as a rule, cause symptoms but lay the groundwork for changes in associated parts. These changes are often found in the soft parts (ligaments, muscles, and fascia) which attempt to compensate for the osseous irregularity.

ILIOLUMBAR AND LUMBOSACRAL LIGAMENTS

In addition to the typical ligaments of the vertebral arches and bodies, the lumbosacral junction is provided with two special ligaments that stabilize and strengthen this transitional area—the iliolumbar and lumbosacral ligaments. They are blended with one another resulting in a special ligamentous arrangement binding the fourth and fifth lumbar vertebrae to the sacrum and innominate bone.

The fibers of the iliolumbar ligament pass from the transverse processes of the fourth and fifth lumbar vertebrae to the iliac crest. It can be considered as the thickened, lower portion of the anterior layer of the lumbodorsal fascia. The medial part of the origin of the quadratus lumborum muscle takes origin from the iliolumbar ligament.

The lumbosacral ligament attaches to the transverse process of the fifth lumbar vertebra and from there, the fibers arch downward to the sacral ala and downward into the pelvis to blend with the fibers of the anterior sacroiliac ligament.

The iliolumbar ligament limits rotation and forward motion of the fifth lumbar segment on the sacral base; it has been referred to as a suspensory ligament of this segment. Both of these special ligaments, together with the transverse process of the fifth lumbar, enter into the formation of the floor of Marcille's triangle.

INTERVERTEBRAL DISKS

Approximately one fourth of the length of the spine is made up by the intervertebral disks. They are largest in those regions of the spine where motion is greatest (cervical and lumbar). The largest in the lumbar region is found between the fifth lumbar vertebra and the sacrum.

In the lumbar area, disks are so shaped as to enhance the formation of the lumbar curve. They take part in the formation of a joint having no articular cavity, no synovial membrane, and no articular capsule. They depend upon the spongiosa of the vertebral bodies for their nutrition and, for this reason, much of the superior and inferior surfaces of the bodies is devoid of compact bone. The disks are subject to compressive forces, flexion, extension, and some rotation as well as to the varying degrees of physical shocks coincident with the stresses and strains of daily life.

The surfaces of a vertebral segment can be divided into three zones, an intervertebral disk into three parts. The most depressed part of the surfaces of a vertebral body is found at the contact site of the nucleus pulposus, just posterior to the center of the body surface. The area is perforated by numerous small openings. External to this zone is one marked by openings of larger diameter. Neither of these zones is covered by compact bone but represent the spongiosa of the body. The peripheral zone, the epiphyseal ring composed of compact bone, originates from secondary centers of ossification laid down about the tenth year of life and fuses with the larger part of the body about the twentieth year.

The intervertebral disk is composed of cartilaginous plates, a nucleus pulposus, and an annulus fibrosus. The cartilaginous plates lie over the two perforated zones of the vertebral body. The nucleus pulposus is a somewhat rounded mass, flattened above and below, located just posterior to the center of the disk, and composed of about 80 per cent water, which it draws through the cartilaginous plates from the vascular spongiosa of the vertebral body. The absence of compact bone in this region is, no doubt, in the interest of disk nutrition and fluid content. The nucleus distributes pressure and distributes and absorbs shock. The nucleus pulposus is not sharply demarcated from the annulus, especially in the older individual.

The annulus is of stronger architecture, having firmer attachment and greater tenacity. When a disk is cut in the horizontal plane, the fibers are seen to lie, for the most part, in the oblique plane and to form concentric rings. Some of the peripheral fibers pass into the rim of the vertebral body; a strong attachment is provided anteriorly where the fibers blend with the anterior longitudinal ligament and a much weaker one posteriorly where some pass into the posterior longitudinal ligament. The characteristics of the posterior and weaker attachment may favor damage in this area, resulting from alteration of vertebral mechanics, injury, and specific bone infections. The intervertebral disks are known to undergo early degenerative change, resulting in the alteration of the spinal pattern of the aged.

SPINAL MOTION

General Motion.—The amount of motion between two vertebral segments is not great; it is the combined regional motion that permits the extensive motions of the spine. Motion of the spine should not be confused with that taking place at the craniospinal and hip joints. The physiological movements of the spine are flexion, extension, lateral flexion or side-bending, and rotation.

The motions of the spine that take place when the spine is in "easy normal" and those which take place when the spine is in marked flexion or extension should also be considered. "Easy normal," as described by the Academy of Applied Osteopathy, is "the range of motion between the position where definite limitation of motion of facets is found in extension of a given area and that position where definite limitation of motion of the facets is found in flexion of the same area." In "easy normal" the lack of restriction on the facets has certain effects on the mechanics of the spine.

Intervertebral motion is permitted by (1) the flexibility of the disks, (2) the laxity of the capsular ligaments, and (3) the apposition of articular surfaces.

Lumbar Motion.—Flexion and *extension* are free in the lumbar region; the degree of these motions increases from above downward until, at the lumbosacral junction, they are found to be greatest.

Lateral flexion or side-bending is free and almost evenly distributed in the lumbar region. Some slight increase is sometimes seen distally.

The degree of *rotation* in the lumbar region is so slight that great differences of opinion exist concerning it. This can be easily appreciated if one recalls the variation of facet facings, especially in the lower portion of this region. Some believe that rotation is precluded due to the shape of the facets. The slight amount of motion that is usually possible is due to the laxity of the synovial joints—the joint space. Forced rotation is possible and is the type so frequently responsible for torsional injuries of the low back.

Circumduction is a type of motion sometimes described, but such motion is the result of a combination of the movements described above.

MUSCLES AND RELATED STRUCTURES

The muscles of the pelvic and lumbar regions may be considered as being divided into two functional groups—those concerned with the maintenance of posture and those concerned with motion. There is, of course, some overlapping of these functions since the muscles of postural tone are also capable of producing motion.

The postural tone of muscles is under the control of the autonomic nervous system. This duty should be performed without effort and without producing fatigue. Failure makes it necessary for the voluntary muscular control to take over that which should be automatically maintained. The position of the spinal segments is no longer maintained in "easy normal"; the normal spinal curves are increased—an increase that is accompanied by joint strain since joint surfaces are held at the limit of motion permitted. Further effort on the part of the muscular system and associated ligaments and fascia is required to maintain a given position. Gradually the faulty and abnormal curves become rigid with marked restriction of motion—a condition that may be progressive as the degree of periarticular change increases.

Space does not permit a discussion of the deep muscles of the back but a thorough understanding of them should be the general knowledge of all well-qualified osteopathic physicians. In the lumbar region, they should be visualized as being more massive and the associated fascia heavier than in other spinal regions.

The upper and lower extremities have direct muscular connection with the lumbar region, the upper extremity with the pelvis also. Therefore, sudden and forceful motions of the extremities are often productive of torsional strain in the lumbar region—an area where rotation is restricted.

The latissimus dorsi may be considered a padding muscle of the trunk, having a spinal attachment to the lower six thoracic vertebrae and, by way of the posterior lamella of the lumbodorsal fascia, to the spinous processes of the lumbar region. It also arises from the posterior part of the external lip of the iliac crest and to the lower three ribs. Passing upward and laterally, it crosses the posterolateral aspect of the thorax and into the axillary region where it forms part of the posterior wall of the axillary space. It finally inserts in the floor of the intertubercular groove of the humerus. This muscle is one explanation for cases of low-back pain combined with shoulder pain and is often responsible for many cases of shoulder pain that do not respond to any form of treatment until the spinal defects have been eliminated.

The psoas major connects the lumbar spine with the lower extremity. Its origin includes the lumbodorsal junction but omits the lumbosacral junction. Its origin includes the intervertebral disks and the vertebral bodies and transverse processes of the lumbar vertebrae. Passing lateral to the lumbosacral junction, it forms the lateral boundary of Marcille's triangle. Leaving the pelvis beneath the inguinal ligament, it inserts on the lesser trochanter of the femur. When acting from below, it produces forward-bending of the spine and pelvis upon the femoral head and, when acting from above, it assists in flexion of the thigh on the abdomen. As a muscle of locomotion, it regulates the length of the step by flexing the hip joint.

The relationship of four structures of great clinical interest lying in contact with the psoas major muscle should receive special attention: (1) The lumbar plexus of nerves is made up of the anterior primary divisions of the upper four lumbar nerves under cover of this muscle. Some of its branches cross the lumbar transverse processes, from which the muscle takes origin. The following quotation from "The Anatomy of the Human Skeleton" by J. E. Frazer[2] describes these relations of the psoas major to the lumbar nerves well.

These origins from the fronts of the transverse processes account for the presence of the lumbar nerves in the substance

of the psoas, for it is apparent that each nerve as it turns down over the front of the transverse process nest below, must lie on a part of the muscle and so enter its substance; the ilio-inguinal and the ilio-hypogastric nerves do not cross a transverse process so they lie behind the muscle and emerge from under its lateral border, and the fifth lumbar nerve also does not lie in the muscle, whereas the lower part of the fourth, passing down to join it across the fifth transverse process, must run in the muscle for a short part of its course. (2) The ureter lies on the medial part of the psoas major muscle in the abdominal portion of its course. (3) The vermiform appendix, in some instances of retrocecal position, lies on the fascia of the psoas to which it may be firmly bound by adhesions. It is on this account that the psoas test may be positive in cases of inflammation of an appendix so placed. (4) The ganglinated chain lies on the medial part of the origin of the psoas major in the lumbar region—a relationship that should not be overlooked in the evaluation of visceral disease.

There is a normal function for each muscle. Sometimes there are several, and they are always in conjunction with that of others. The function of an abnormal muscle is altered. Spasm of muscles is often found during the course of examination of patients with low-back problems. Tension of the associated fascia accompanies the spasm—a fact that is readily understood if one visualizes the extensive attachment many muscles have to the neighboring fascia. Such conditions generally impede the flow of blood and lymph. With this in mind, may we not think of an increase in the amount of fluid retained in the involved tissues. Lymphatic stasis and chronic passive congestion are forerunners of adhesions and fibrositic masses, characteristic of many cases of altered vertebral mechanics. In any of the stages between edema and adhesions, pressure sufficient to cause pain may be present. Variation in the amount of tissue fluid retained results in a similar variation in the amount of pressure and thus pain and discomfort of varying intensities.

Marcille's triangle[3] is located lateral to the body of the fifth lumbar vertebra in relation to the unstable lumbosacral joint. It is bounded medially by the body of the fifth lumbar, laterally by the medial margin of the psoas major muscle, and below by the ala of the sacrum. Its floor is formed by the anterior surface of the transverse process of the fifth lumbar vertebra and the iliolumbar and lumbosacral ligaments. Through it pass several important structures worthy of note. The contents of the two sides vary slightly.

On the *left side* are:

Left common iliac artery dividing into external iliac and hypogastric arteries in the lower part of the triangle

Left common iliac vein formed in the lower part of the triangle

Inferior mesenteric artery to be continued as the superior hemorrhoidal artery

Internal spermatic or ovarian vessels in the outer part of the area

The ureter

Common iliac glands lying to the medial side of the vessels

Lumbosacral trunk on way to assist in forming the sacral plexus of nerves

Obturator nerve lateral to lumbosacral trunk

Sympathetic trunk in the medial part of the triangle

Large branch of the sympathetic on way to the hypogastric plexus

Genitofemoral nerve.

On the *right side* are:

Nerves which are the same as on the left side

Common iliac veins which unite to form the inferior vena cava.

It is obvious that much of the vascular supply, venous drainage, and nerve supply to parts distal pass this transitional area of the spine. Considering these relations, structural defects of the region should be visualized as disorders capable of producing widespread and often complicated groups of symptoms.

The pelvis is the crossroad between the freely movable segments of the spine and the lower extremities. It has to take part in the motion of these parts and, at the same time, provide stability, transmit body weight, and lodge the pelvic viscera.

The sacrum and innominate bones form a ring, the posterior part of which is massive for the purpose of receiving and transmitting the weight of the superimposed parts of the body. The sacrum is a wedge-like bone placed between the two innominates. Its base is directed upward and its apex downward, characteristics which prevent downward displacement. It is broader anteriorly than posteriorly so that, with the exception of the reciprocal reception of the inequalities on the opposed articular surfaces of the sacroiliac joint, there is no osseous projection to assist in the prevention of its displacement toward the pelvic cavity. It is the duty of the ligaments of the sacroiliac joint to prevent such a change of position. The posterior and interosseous sacroiliac ligaments are strong and composed of fibers crossing in several directions, a feature which gives added strength to an articulation acted upon by a wide variety of forces. The anterior ligament is weaker, although reenforced by the lumbosacral ligament previously described. Backward displacement of the lower part of the sacrum and the coccyx is checked by the sacrotuberous and sacrospinous ligaments.

The sacroiliac articulation is not located close to the surface but lies in a recess between the iliac tuberosities—the portions of the ilia projecting posterior to the auricular surface. Their free borders lie posteromedial to the articulation. Superimposed upon and reenforcing the posterior ligaments of the articulation is the lower portion of the origin of the sacrospinalis muscle. It becomes evident that, while motion between the sacrum and innominate bones may be detected, detection of motion by palpation directly over the joint is impossible.

Provision for the transmission of weight through the pelvis is made for both standing and sitting postures. This is accomplished through arches strengthened by "secondary tie-rods."

The sacrofemoral arch extends from the sacrum to the upper part of the acetabulum and transmits the body weight to the femoral heads in the standing position. This arch is strengthened by a secondary arch, represented by the body of the pubes and the superior pubic rami.

The ischiosacral arch extends from the sacrum to the tuber ischii by way of the ilium, body of the ischium, and the superior ramus of the ischium. It transmits the body weight when in the sitting position. This arch is strengthened by a secondary arch formed by the inferior rami of the ischium and pubes.

The demands coincident with the mechanics of locomotion require that the body weight be shifted from side to side during progression. For this to be accomplished, it is necessary for the pelvis to be elevated on one side and depressed on the other, which requires delicate coordination of muscles of various groups. We should thus think of lumbofemoral musculature combined with pelvifemoral, as represented by the iliopsoas combination, pelvifemoral groups such as the muscles of the gluteal region, adductor muscles of the thigh, and the rectus femoris. A thoracopelvic connection as seen in the quadratus lumborum and deep muscles of the back has been mentioned in the discussion of the lumbar region.

CONCLUSION

Structural integrity of the lumbar spine and pelvis can not be maintained unless the structure and function of the lower extremities are normal. The cause of low-back pain often lies in the lower extremities which, although beyond the scope of this paper, should not be overlooked.

48th and Spruce Sts.

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Some Aspects of Handling the Child Behavior Problem*

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The deviation from normal childhood behavior is as logical and as closely correlated to the principle of cause and effect as any other phenomenon in general pathology. The principle of effective diagnosis of the etiology is as basic in the approach to childhood behavior as in the approach to the general area of dysfunction. Disturbances in behavior are symptoms of more serious and important etiological factors. It is essential that we as physicians shall be prepared to cope with these problems on an intelligent, scientific, yet personal basis. The social attitude that behavior problems require only one method of handling, such as punishment or reprisal, must be recognized as basically inappropriate and usually ineffective except possibly for suppressing such behavior. We used to "fight" fever and other physiological symptoms in a similar manner. Let us recognize that misbehavior is just as physiological as fever and may have as great a number of variable factors in its etiology. It is important, too, to remember that deviations from normal may be in any direction away from normal. Inactivity may be just as pathological as inappropriate activity.

For practical purposes the etiological factors of misbehavior will be divided into three general groups: the organic, the environmental, and the psychological. It should be kept in mind that these three areas are not discrete but richly intermingled in a most complex manner. All function, and therefore all behavior, is built out of the reciprocal interrelationship of the psyche, the environment, and the viscerosomatic constitution. It is to be expected that disturbance in any one may be reciprocally related to the other two.

ORGANIC ETIOLOGY

The strictly organic etiologies include many gross defects which fall in the area of pediatric care. These are congenital defects, the birth injury problems, and the acquired impairments of organic structure. In the grossest aspects, these organic factors are usually recognized early and the resultant defects of behavior understood. In milder degrees of involvement, however, the recognition of these defects may require a high diagnostic acumen.

For instance, gross feeblemindedness is easily noted, but the subnormal borderline groups may adapt sufficiently in many ways to appear generally normal.[1] Only in certain areas requiring good intelligence does the defect cause misbehavior. The proper diagnostic use of an intelligence test may greatly modify the handling of a child. The reduction of misconduct is achieved by lowering the performance requirements to those which are attainable by the child. Borderline endocrine deficiencies may result in retardation with poor capacity to adjust and meet demands at any age.[2] Visual and reading disabilities may go unnoticed for years, with resulting poor scholastic records associated with indifference, belligerence, or truancy.[2] Simple reading tests and visual examination may be of critical value in solving the problem of misbehavior. Audiometric testing often reveals unrecognized deviations.

Birth injuries or subsequent physical trauma to the head may produce gross organic defects, but more commonly result in less easily recognized pathology, with disturbances which may have far-reaching effects on both bodily function and general behavior. The gentle technics of cranial therapeutics, as has been clinically demonstrated, are effective in helping children with head injuries.

There is a well-established syndrome of traumatic enuresis, as Robuck[3] demonstrated by osteopathic research, which responds specifically to corrective osteopathic manipulative procedures. Enuresis is also known to have an etiology in congenital vagotonia. Sympathomimetic drugs are required to resolve the symptoms. Gonadal dysfunction also has been found to be a factor in enuresis. This type requires the use of androgen therapy in the male.[4] It certainly should not need emphasis that general osteopathic spinal evaluation and treatment of osteopathic pathology will remarkably assist in alleviating many behavior problems by normalizing general bodily function, reducing somatic tension of psychic origin, and removing foci of irritability which develop around all osteopathic structural pathologies.

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One of the most striking of the behavior problems is the one which arises as a sequel of childhood encephalitis.[5] Following recovery from such inflammations, which may or may not have been recognized, some children exhibit a fairly consistent abnormal behavior pattern. These children have lost the fine discrimination and control arising from the moral sense. They are socially amoral. Their behavior disorders include chronic truancy, wandering, general irresponsibility, pathological lying, and stealing. There may be explosive rage. Discipline is futile. There is a defect of learning from experience and so mental maturity is never attained. Other areas of intelligence may or may not be affected. The pattern may extend into dangerous criminal behavior and general antisocial conduct. This is one type of the classification known as the psychopathic personality.

These children are often difficult to evaluate and much effort may be spent in trying to control or help them. An electroencephalograph may reveal the degree of cerebral involvement in the majority of cases and a history of a severe or transient fever with symptoms of central nervous inflammation may be elicited. Encephalitis has clinically been found as a complication of measles,[6] German measles, scarlet fever, whooping cough, vaccinations,[7] infectious hepatitis, herpes zoster,[8] pneumonia,[9] mononucleosis,[10] diphtheria, chickenpox, malaria,[11] mumps,[12] influenza, and intoxications. A serous productive type described by Hassin,[13] which is rarely diagnosed, and a nonpurulent hemorrhagic type occur especially in children. Other neurological findings may or may not be associated with misbehavior of the encephalitic etiology. Children with postencephalitic symptoms respond to no known treatment and must be protected from society before society finds it necessary to protect itself from them.

ENVIRONMENTAL ETIOLOGY

Essentially normal children may easily be driven to misbehavior by environmental stress.[14] As cited by Saul,[15] "There are no problem children, only problem parents." Children vary widely in their susceptibility to environmental trauma and in their reaction to it. There always can be, however, an extreme in environmental situations which can disturb the behavior of the most stable child. As one evaluates case histories, one can find extreme forms of environmental trauma in the background of many behavior problems.

The center of environmental trauma is usually in the home setting. Alcoholic, negligent, abusive, or generally disturbed parents may directly threaten the actual physical welfare of children. Excessive rigidity of values, domination, or possessiveness in parents may serve equally to limit the child's environmental experience and stunt or disorganize his physical maturity, adjustment to eating, and general social activity. This is just as common in "very good" families as in those of lower class homes.

The information concerning the family situation may be difficult to elicit and must often be obtained by observation of the parental handling of the child and by gaining the confidence of the child to obtain his statement of the situation. The evaluation of the domestic pattern should be at two levels: first, from observation and collecting general information from all informants; secondly, by obtaining or estimating the reaction of the individual child to such experiences. In working with younger children, play therapy is often helpful. The play setting is built around the known or suspected traumatic area and the child's reactions observed. His evaluations can be vividly revealed as he enacts his interpretation of "mother," "father," "teacher," and "siblings," and his desired treatment of them.

The basic solution of the problem of environmental etiological factors obviously lies in manipulating the disturbing elements out of the environment. This usually involves treating the parents. When that fails, changing or modifying the child's environment by the best methods available may be attempted. Intelligent solutions are always difficult and the best adaptation possible is often not flawless. Often one can only make the most of the little that is available.

The school situation may be traumatic because of poorly trained and badly adjusted teachers. There is a growing literature to assist teachers in gaining a better understanding of child psychology and the handling of behavior problems.[16,17,18] Surgical operations,[19] severe accidents, and other environmental threats can disorganize childhood behavior and may be very threatening to unstable children.

PSYCHOLOGICAL ETIOLOGY

The psychological etiology of misbehavior need not be any more of a mystery than the organic and environmental factors. Here again available information and observation of known facts should help in the diagnosis and solution of behavior problems.

Normal Misbehavior.—Much of the so-called normal misbehavior of children falls into a borderline area of activity which is a normal aspect of the maturing process. It is a tacit recognition of this fact which is expressed in the common statement, "He is just too good a child. I'm worried about him. He never gives me any trouble." Or as one mother so graphically stated it, "Our slightest disapproval was our son's greatest concern and the only punishment required; my other children were more normal and troublesome."

The growing child is not only busy becoming familiar with his body and the physical environment, but is just as active in his experimental investigation of his mental-emotional equipment.[20] He can best test his psychological strength against resistance. As new abilities add greater possibilities of producing an effect upon his environment it is logical for the child to exploit them. Activity which is acceptable or approved lacks the validity of a test, for it is a known area which has been learned and is familiar. Misbehavior, however, is always new and untested territory. Willful, mischievous disobedience is often merely a game which the child is playing to test the limits of his new strength against parental authority. In this way the normal child is often playfully challenging the parents' "don'ts." The very way young children wait for the parents to see that they are deliberately disobeying shows the purpose in mind.

The actual nature of the misbehavior or its object is rarely important to the child in this kind of testing game. What is important to the child is how far he can go before parental control exerts enough pressure to outbalance his own strength. The child's desire or purpose is not to win, but just to exert his own authority against resistance to enjoy the new found strength. Quite often the child is permitted to win and this may confuse him, for he has no measure of parental control, no frame of reference to evaluate further behavior. He also is not sure of parental strength and may either become insecure or guilty or misbehave further until a reaction is produced in the

parent that is adequate to satisfy his needs. If enough guilt develops, this reaction may require punishment to relieve the child's state of mind.

In general, this testing of new psychological strength continues through adolescence to maturity and independence, but it is seen in its pure form only in the preschool child. After the fifth to the seventh year the process has several complicating factors. The child well knows by then just what the parental reaction will be, and secondary reactions to them, and to a host of other areas of conflict, give rise to more organized and complicated misbehavior patterns.

Pathological Misbehavior.—When misbehavior ceases to be play on the part of the child it becomes a necessity to him. It is the safety valve of accumulated emotional tension. His behavior reflects his own internal state and is just as logical, even essential, as any other effect of a dynamic cause.

To meet this behavior by punishment, shaming, or with the pithy irrelevance, "you are old enough to know better," adds more tension to the disturbed child, is confusing, and therefore increases the problem.

Most normal children accumulate hostility against all members of their family. Inasmuch as parents force upon the child much that he does not want, and since at the same time he is in need of parental love and approval, a basic conflict is bound to develop in any child at an unconscious level. This ambivalent love-hate conflict can give rise to direct explosive aggression against almost any other area of the environment.

Doing things that are "bad" then becomes a means of expressing this aggression. Lying is a further phase and results in guilt, anxiety, and insecurity. This circle builds up and up in a wide variation of patterns until the child finds some way to save face and get back to normal again. Punishment is often acceptable at this point and relieves the accumulated guilt and permits the balancing love a chance to find expression.

If parental control is stupid, illogical, or variable, the child soon learns to break through it into misbehavior and he loses respect for the parent who cannot provide an adequate balance against his own strength. This leads to autonomy of the child in the family setting, often manifested by constant acts of misbehavior to express the increasing confusion, frustration, and rage of the inadequate and isolated child.

Excessive domination and unreasonable punishment, of course, produce counter-reaction and aggressive misbehavior in a normal child. An insecure child may become neurotic in his self defense pattern. From infancy children are very sensitive to insincerity and false motives of parents. They are keenly aware of the degree of parental love and of its withdrawal. They are never again completely secure and relaxed if at any time they have been rejected or the home has been seriously threatened by parental conflict, separations, or long illnesses of parents. Childhood security[21] is easily disturbed and children vary in their security-stability needs. Anything which immediately threatens the child's status quo or the supply of food, love, and approval may result in anxiety and the loss of the sense of security.

The confusion of the child in his early close relationships to mother and father may never be adequately resolved if parental harmony does not prevail. The process of conscious or unconscious identification with both parents in a clear manner is disturbed and may result in a poorly organized super-ego, or conscience, which normally arises out of this introjection of the mother-father values during the preschool period.[22] If this process is faulty the moral structure may be inadequate and asocial behavior or serious misbehavior may result. Such problems are often projected forward into poor adolescent adjustment.

Accumulated guilt alone may result in misbehavior to obtain punishment. This and many other factors enter into the psychological etiology of the misbehavior of children. A careful investigation of the development of the child and his reaction pattern to his environmental experiences will usually give a reasonable explanation of the problem. The management of the problem requires that the parents, the teacher, and the child shall all find a better basis of understanding each other and themselves. This can often be accomplished by a few consultations with each separately, allowing application of sound judgment and educational information and the release of pent-up conflict and confusion through talking it out.

If the problem is too acute a competent psychiatrist may be required. In many population centers there are developing a number of opportunities for obtaining trained help in treating these problems. These include child guidance centers; school counselors; family relation commissions, bureaus, and clinics; and general psychiatric clinics in medical schools. General welfare agencies as well as child welfare organizations often have assistance of this kind. Physicians should learn of the services of such facilities which are nearest. It is helpful to know the basis and method of referral, the cost and type of service available and, if possible, to visit such institutions in order to become more familiar with their methods and smooth the way for effective cooperation when it will be most needed. Such knowledge gives the physician a great deal of prestige; confidence in him is enhanced when he uses this knowledge with authority.

There is a great need for a rapid expansion and growth of child guidance facilities in all areas. Much information and knowledge exists for the help of parents and children and a great deal more could be put to use if such centers were available to all the population.

Adolescent Behavior Problem.—A brief word about the adolescent problem of society today. It is significant that before the turn of this century, the social problem of adolescence was relatively unknown.[23] The sharp rise in delinquency, criminality, and destructive behavior in adolescent age groups on an asocial or antisocial basis is not difficult to understand.

The basic problem of adolescence is to span the gap from childhood to adulthood. One of the major phases of this achievement is the attainment of a sound basis of values which are realistic, practical, and moral for the society in which the individual is going to live. This was no particular problem to the adolescent of 50 years ago. The social structure in which he grew up was uniform with specifically standardized moral values for everyone in the community. There was very little variation in basic values and accepted modes of behavior. The pattern was set, clearly to be seen, and deviation was dealt with severely. The values learned in childhood could be used in adult life without much modification.

Things are vastly different now. Behavior has been revolutionized over and over again. Each generation has had to make major adaptations to the changing environmental scene. Entirely new reflex habits are

required just to keep alive in the modern scene. *No two families have made these adaptations and revised their set of values in just the same way.* When this process of divergence from uniformity is repeated by several generations and accelerated by two wars, myriad patterns of undeterminable potentials result.

In this scene of no two households holding to more than a shell of common belief, the adolescent finds he must form his own set of values out of the maze of his environment. So rapidly have changes occurred in behavior values that his very routine activities will be in a different area than his parents, and few old patterns or values are valid. New patterns must be made and evaluated by experience.

Such circumstances tax to the very limit the capacity of the adolescent to build valid patterns for himself, even under ideal home conditions. It is small wonder that an increasing number fall on the fringe of antisocial patterns in their search for possible answers to their dilemma.

Under such conditions the errors of handling the maturing child by ignorant, immature, and disturbed parents becomes profoundly magnified in significance. The rather routine mistakes of earlier generations become crucial in the modern scene. Any disturbance in the early childhood development may easily become the weak link in an adolescent personality, which cannot stand the strain of adaptation and reintegration in a rapidly changing world.

The parent who has caused disturbances in childhood personality formation is usually the same one who produces further disturbances by actively mishandling the adolescent. This is often the history found when delinquent adolescents in first offender court cases are examined clinically.

At the other extreme is the adolescent who has not attempted to determine his own values, who is expecting to find reality as he heard about it when a child. His behavior disturbances fall in the area of neuroses or psychoses. He is the victim of anxiety, inadequacy, frustration, and rigid values which have restricted his experience to a bare minimum of reality contact. He is unstable and will make a very poor adult adjustment until he faces and accepts reality for what it is.

Needs of Children.—Children should not be forced to accept their parents' thoughts for they have their own thoughts, but children do have very real needs and parents are the ideal ones to fulfill these needs. The greatest central need is security, physical, social, and emotional security.[15] This should be strongly founded on love *to which the child can respond.* Out of this can grow a warmth of affection, mutual understanding, and respect. It is now known that respect is a reciprocal value. The child respects only the parent who respects him and not otherwise, try as he may.

An excess of both security and loving can be just as destructive to childhood personality as a deficiency in the supply of these needs. Many parents live out their own needs for love and general security by excessive affection and overprotection. Few parents know the art of using the right kind of encouragement to fit the child's needs. Usually parents are critical or overly anxious for the child's success to fulfill their own pride and selfish needs of vicarious attainment. Children who feel used in this way soon become obdurate and resentful. Parents who do not keep up with modern trends and viewpoints can easily rob the child of the fulfillment of many of his needs. This also will destroy mutual understanding and result in resentment and conflict. Thus one can see that the normal needs of normal children are commonly not fully met even in the average or above average home.

The normal healthy child can adapt remarkably to many minor defects and deficiencies in the supply of his basic needs and make an average adjustment to adult living. The highly sensitive and constitutionally unstable child may have great difficulty in making even simple adaptations. When there is gross deficiency in supplying the child's needs or when his adaptive capacity is inadequate, serious behavior problems are likely to result.

SUMMARY AND CONCLUSION

It has been postulated that the behavior deviations of children are the logical result of a wide range of etiological factors. The general nature of these factors has been discussed in terms of disturbances in the physiological, environmental, and psychological areas. Some aspects of managing behavior problems in children have been suggested and some aspects of the dynamics of personality development have been touched on.

It is the responsibility of the osteopathic physician to be prepared to understand the wide range of behavior problems in children. These problems are the logical outcome of dynamic forces, and intelligent investigation should reveal the specific etiology in most cases.

Effective handling of these problems requires a knowledge of the modern trends in child guidance and child psychology. Knowing what to do and where to get help is often of crucial importance. The physician can do much for children by taking a little time to determine their thoughts and by helping the parents achieve a better understanding of the child's needs.

Each case is a unique problem. Each offers an opportunity for the physician to render some of his most useful service. He may save years of suffering by treating disturbed and disturbing children early.

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Malignancy of the Lower Intestinal Tract*

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There is little, if anything, new to be said regarding carcinoma of the colon, sigmoid, and rectum. The facts regarding this disease are fairly well standardized. But it becomes quite necessary to reacquaint ourselves with this problem when we realize that so many individuals are living to an age that makes the specialty of geriatrics as important as is the specialty of pediatrics.

Colonic and rectal malignancy constitutes about 11 to 15 per cent of all cancer and is second in frequency only to gastric carcinoma in digestive tract involvement. Since the majority of these cases are found between the ages of 50 and 70—although it must be emphasized that youth itself does not preclude existence of the disease—the rate of incidence should apparently increase now that more people are living longer.

By no means does this last statement imply that the younger age groups are to be neglected in the diagnosis of malignancy of the lower digestive tract. It is high time that we, as physicians, begin to forget that age may have anything at all to do with the existence of cancer. This applies to cancer in all locations. Too often we see young patients with malignant disease which many doctors have passed over because they have assumed that the youth of the patient made the existence of malignant disease impossible.

Much has been done in the past 15 to 20 years, both within and without the healing arts professions, toward the resolution of the cancer problem, but a great deal more is still to be accomplished. The American Cancer Society, an organization of laymen, is doing really masterful work in cancer education among the laity which should show increasing results as the years go on. It has been said that the efforts of this Society have fostered cancer phobias where they need not exist and created neurotics who keep the possibility of malignancy as the cause of their anxiety. However, the public is rapidly learning that periodic physical examinations, even in the absence of any symptoms, are most valuable. The great difficulty is that too few know where to go to have these examinations properly conducted. The feeling exists that the average physician is too busy or is unwilling to spend time with well patients. It has also been learned that when such examinations are undertaken they are too often slipshod, superficial, and relatively valueless.

New and commendable consideration of a portion of this problem has been undertaken recently with the creation by the Philadelphia County Medical Society of a committee for the study of pelvic cancer. Leading gynecologists of this section and others who are interested meet at luncheon once a month for the study of all cases of pelvic cancer in which there has been delay in diagnosis and management, in an effort to educate the profession in the need for earlier and more adequate pelvic examinations. The successes of this committee in the past 2 years constitute good reason for the creation of similar committees to study the problems of gastrointestinal malignancy, case by case. In my opinion this would be a good thing.

In attending the meetings of this committee it has been my observation that glaring errors arise in proportion to the frequency with which physicians fail to perform adequate examinations. And not only does a single physician frequently fail in an individual case, but very often the number runs as high as five or six before the patient gets into the hands of one who diagnoses his trouble. Too many people wish adequate periodic examination and, as I have said above, do not know where to go to get it.

An initial visit should include thorough history taking and a carefully performed, detailed systematic examination. Subsequent reviews of the physical side of the patient's problem do not consume a great deal of time; if carried out in a routine fashion, they can be done rather quickly and yet be very complete.

DIAGNOSIS

The essential plea that is being made in this paper is for earlier diagnosis of large bowel malignancy, both in those individuals with no symptoms who seek periodic examinations and in those with early symptoms that might be due to carcinoma. Without complete and specific knowledge as to the etiology of this disease, we can do little toward its prevention. Thus, for adequate management and eradication, recognition of the condition in its incipient phase is of paramount importance.

So far as the large intestine is concerned, there is one etiologic factor that has some direct significance. It is well known that polyposis, both solitary and multiple, is a precursor of malignancy in this area. Indeed it is felt by many that every carcinoma of

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the large intestine begins as a polyp. These polyps may be pedunculated or sessile, and all should be considered malignant until there is laboratory proof to the contrary. In the majority of patients polyposis is an acquired condition, but there are a few congenital cases of the familial type which may be so extensive as to require total colectomy to prevent the development of malignancy. The sessile variety, for diagnosis, must be removed by segmental resection with end-to-end anastomosis. The pedunculated variety may be removed with a coagulating snare through an endoscope introduced by rectum or, when the lesion is beyond the range of the rectally introduced sigmoidoscope, through a small colonic opening made at laparotomy.

There are two chief varieties of carcinoma that occur in the large bowel. The first is a medullary adenocarcinoma. These tumors tend to produce a large cauliflower mass which projects into the lumen of the bowel and for the most part are found in the cecum and ascending colon. They fail, in this location, to produce early evidence of obstruction but, because ulceration and infection occur early, hemorrhage and purulent discharges result with symptoms of toxicity and anemia. The second variety is the scirrhous or fibrous carcinoma which tends to produce annular constriction and which may or may not ulcerate. It has a pronounced tendency to occur in the descending colon, sigmoid, and rectum and produces little symptomatology other than that due to obstruction of the more or less solid fecal column normal to this area. A third variety is the mucoid or colloid carcinoma which makes up about 5 per cent of all large bowel malignancies and is characterized by large amounts of gelatinous substance contained within the tissue of the tumor itself. By means of lateral pressure it tends to infiltrate rather widely and causes marked thickening of the intestinal wall, producing a relatively poor prognosis regardless of the type of therapy.

The following procedure is recommended for the routine investigation of patients on a periodic basis. Brief questioning is undertaken concerning any change in the bowel habits of the individual toward constipation, diarrhea, or alternation of these two states; the existence of a progressive fatigue syndrome; the gross characteristics of stools and whether or not they contain obvious blood; and the occurrence of postprandial distention, borborygmi, and flatus.

In the average person, with no evidence of abnormal symptomatology, the following physical examination is next carried out. The patient is placed in the supine position and the abdomen, completely uncovered and fully exposed, is inspected as to contour under adequate lighting. Gentle palpation, first superficial and later deep but still gentle, is carried out beginning at the cecum and ascending along the course of the large bowel on to the left lower quadrant. The relative size of liver and spleen are noted by palpation and percussion and brief notation made in the records of all findings.

It is not uncommon in such examinations to find a rather firm, definite sausage-like mass which will roll under the fingers and be somewhat sensitive upon palpation of both lower left and lower right quadrants. If this area is temporarily abandoned and then returned to for further palpation, it is noted that frequently there is a change in the palpable consistency of the tissues beneath the finger. It is my impression that this is due to temporary spasm in the bowel wall which lasts for a few minutes and then disappears, causing an absence of palpable findings. Recurrence of these findings during the examination indicates need for additional study.

The patient is next placed in lithotomy position with lower extremities supported by Bierhoff crutches. Following adequate bimanual and specular examination in the female, a finger encased in a finger cot is inserted into the rectum. Improperly conducted examinations produce rigidity or muscle guarding on the part of the patient and interfere with the ability to make adequate examination, but digital palpation of the anal canal and rectum can be carried out in almost every instance without discomfort to the patient, if properly performed. The ball of the well-lubricated finger is placed against the anal orifice and gentle but continued pressure applied. Partial insertion and withdrawal will finally make possible full introduction of the finger without distress.

The examining finger is gently swept about the periphery of the rectum into all quadrants. Gentle external pressure is made to confirm abdominovaginal findings in the female as well as to locate any palpable neoplasm that may be rather high in the rectosigmoid area or even in the sigmoid flexure itself. Palpation of the prostate in the male can be carried out with the same maneuver and any abnormality which might require further investigation is noted. Seventy-five per cent of malignancies in the large bowel lie within the range of the palpating finger since most are confined to the rectum, rectosigmoid, and sigmoid.

Digital examination is followed by gentle proctoscopy utilizing a Brinkerhoff or comparable proctoscope to determine the status of the hemorrhoidal plexus as well as to visualize the rectal mucosa and find sessile or pedunculated polyps that may be sufficiently small and soft to be missed by the palpating finger.

All this examination, including the questioning which can be done during the examination, takes but about 5 minutes. Any positive findings demand that further investigation be carried out. Changes in bowel habits, especially increase in constipation, indicate the need for sigmoidoscopy. A sigmoidoscope should be as much a part of the armamentarium of any general practitioner as is a stethoscope or clinical thermometer. The technic of sigmoidoscopy is not difficult and although a good distally lighted instrument may cost as much as $50.00 to $75.00, its life is long and the instrument should pay for itself before very many months have passed, if adequately used.

Endoscopic examination of the rectum, rectosigmoid, and sigmoid colon should not be a harrowing procedure for the patient or the physician. It can be readily accomplished with the patient in knee-chest position. The patient should be prepared about 3 hours before examination by the use of cleansing enemas until they return clear. After introduction of the previously warmed and well-lubricated instrument through the anal canal, the obturator is removed and the instrument gently inserted under direct visualization without any pressure until it has passed the Houston valves and the rectosigmoid flexure. The patient should be cautioned that some moderate abdominal discomfort will be noted as the tip of the instrument passes the lumbosacral angle and when the instrument has been introduced to its full extent. Thorough inspection of all segments of the bowel wall is carried out as the instrument is gradually

withdrawn. Polyps may be removed with an electrosurgical snare in the course of this procedure. Any tumor noted may be biopsied during the course of inspection.

Following endoscopic examination of the distal large bowel, the patient should then be sent to a competent roentgenologist for barium enema study of the entire colon. This may be followed with a double contrast study if the examiner feels that it is indicated. The distal large bowel is a radiographic "no man's land" since the cecum which very frequently folds back and forth on itself in the pouch of Douglas produces an opaque obscurity with indefinite findings. Sigmoidoscopy should precede every x-ray examination of the colon with the possible exception of those for lesions in the splenic and hepatic flexures and cecum.

Without question, the most common cause of bloody stool is the existence of internal hemorrhoids. Too often, however, we are prone to forget that malignancy in the large bowel and hemorrhoids can exist in the same patient. Many large clinics report that at least 10 to 20 per cent of patients who are admitted for cancer of the rectum or large bowel have undergone hemorrhoidectomy in the management of bleeding noted at defecation. So I reiterate that every patient with rectal bleeding, even though the hemorrhage is only occasional, should be submitted to examination, which includes in the order mentioned, rectal digital palpation, sigmoidoscopy, and barium enema study. The existence of a palpable mass which is probably malignant or one seen with the aid of a sigmoidoscope does not preclude the possibility of a comparable lesion at some other point higher up. It is for this reason that the barium enema study should be utilized.

Before leaving the subject of diagnosis I must call your attention to the frequency of anemia bordering on primary pernicious anemia in patients with malignant lesions in the cecum and ascending colon. No evaluation is complete without an erythrocyte count and hemoglobin determination. If these findings are low, the patient should have the benefit of fecal analysis for blood as well as a barium enema study.

MANAGEMENT

The only procedure available for the eradication of malignancy of the large bowel at the present time is the complete surgical removal of the offending tumor. X-ray and radium therapy have no place in the modern management. Hence, when diagnosis is adequately made the patient should immediately be hospitalized and prepared for the necessary intervention. This involves about a week's hospital stay prior to operation for the restoration of blood count to normal as well as normalization of the blood chemistry, especially the protein and chloride fractions. High protein, high vitamin, nonresidue diets are used for this week of preparation together with such antibacterial agents as Sulfasuxadine. These agents reduce the bacterial flora in the intestinal contents, thus reducing the possibility of peritonitis by soil at surgery as well as insuring better healing after the operation. Adequate intake of vitamin C is insured by administration of 250 mgm. of ascorbic acid three times daily.

The decision as to whether the condition is curable by surgical intervention usually awaits laparotomy. It is to be remembered that carcinoma in this location spreads in three ways: by direct extension to adjacent tissues, by embolic spread along the tributaries of the portal vein to the liver, and by means of lymphatic drainage into preaortic nodes which eventually drain into the thoracic duct. A solitary nodule in the liver may be the only metastasis. If it is removed and the resulting cavity packed with Oxycel or Gelfoam and sutured over, adequate treatment of the initial lesion may then cure the patient. Direct extensions are often apparently hopeless but may be due in large part to inflammation about the area of tumor; complete excision frequently cures cases which seem beyond surgical help.

Carcinoma of the cecum, ascending colon, and hepatic flexure are very often quite extensive locally and yet a great many of these cases are cured by the simple expedient of utilizing ileocolectomy with removal of at least 6 inches of the terminal ileum, the cecum, the ascending colon and the right half of the transverse colon en masse with the adjacent mesentery containing whatever lymph nodes may be involved. Primary end-to-end or end-to-side anastomosis restores bowel continuity with a relatively low operative mortality and a high 5-year survival rate. It is probably the wide mesenteric resection which gives such good terminal results in a majority of these patients. With a better understanding of blood chemistry, the utilization of blood transfusions, and with controlled continuous spinal anesthesia making surgery so much safer, the need for exteriorization loop colostomies, after the procedure of Mikulicz, has disappeared. This operation has fallen into disrepute because it was rarely sufficient to completely eradicate the disease. Only a very small segment of mesentery, or none at all, was removed. Thus involved nodes were left behind and there was always the possibility of tumor grafting of the parietal incision at the time of surgery.

Lesions in the left large bowel, sigmoid, and rectum are prone to produce obstruction as the first symptom of the disease. It is not uncommon to find that the patient presents himself because of inability to have any bowel movement, with no previous symptoms whatsoever. As previously stated, most of these lesions are of the scirrhous and fibrous type and annular in distribution. Obstruction is caused by absorption of water from the fecal stream in the proximal bowel, with a tendency toward packing at the site of stricture. The obstructive mechanism is most often produced by the bowel wall edema adjacent to the site of tumor.

Decompression of the bowel can often be accomplished without recourse to proximal colostomy by utilizing frequent, slowly-given, warm tap water enemas. If necessary, 1 ounce of peroxide may be added to each quart of water to soften the stool and allow its passage through a narrowed lumen. Since these patients are relatively comfortable, several days' trial may be made at removal of the obstructive contents. If unsuccessful, simple loop colostomy carried out in the transverse colon toward the hepatic flexure may be required. This last is a temporary measure and after thorough decompression and rehabilitation of the patient, anterior resection is necessary. At least 3 inches of normal bowel with its supplying mesentery must be removed from either side of the tumor. Following this removal, end-to-end anastomosis is made to preserve intestinal continuity.

In the management of lesions in the sigmoid, rectosigmoid and rectum, there is almost complete unanimity regarding the advisability of the one stage

abdominoperineal proctosigmoidectomy as described in 1908 by Miles. Sphincter preserving operations producing perineal colostomies have been advocated by Babcock and Bacon,[1] but they are almost the only advocates of such procedure. As recently as 2 years ago I had the privilege of hearing an excellent paper on cancer of the rectum and rectosigmoid presented in Atlantic City by Fred W. Rankin, M.D.[2] This comprehensive presentation was discussed by Thomas E. Jones, Leland S. McKittrick, and Frank Lahey. Unanimously they felt that the work of Miles constitutes the greatest contribution which has yet been made to surgery in this field. Surgical procedures for removal of rectal cancer have been devised by both Rankin and Lahey, but they have largely discarded them. They feel that the combined abdominoperineal operation as developed by Miles has not yet been excelled.

The tendency to avoid permanent abdominal colostomy is a natural thing. Both physicians and patients dread this proeedure, chiefly because they do not realize how easy it is to manage a colostomy. I think it is time that we changed our attitude, because the average, properly managed patient is quite comfortable and does not have to utilize a colostomy bag for prevention of soiling. These patients eat a constipating nonresidue diet, avoid gas-producing foods, fruit juices, and alcoholic beverages, give themselves enemas daily or every other day through the properly formed colostomy, and merely wear a gauze pad or square held in place with a web belt over the colostomy opening. They rarely leak feces or gas and the average person who does not know of their condition by direct report detects no evidence of colostomy, either from odor or appearance.

However, since Gilchrist and David[3] made their extensive study on lymphatic metastasis and showed that retrograde spread to nodes below the lesion occurs only when those central to the tumor are completely replaced by carcinoma to block lymphatic drainage, the tendency has been toward the use of primary anterior resection with end-to-end anastomosis in all lesions lying above the most dependent portion of the pouch of Douglas and which have not produced spread into the adjacent tissues by direct extension. Although this procedure is now being utilized at the Mayo Clinic and by such men as Wangensteen,[4] Mulholland,[5] and Dixon,[6] sufficient time has not elapsed to allow complete evaluation of the end results on the basis of 5-year and 10-year cures. This procedure has the advantage of avoiding permanent abdominal colostomy and if the curability rate is as great as it is with Miles resection it should be the procedure employed.

CONCLUSIONS

1. Adequate periodic examination to prevent progress of silent tumors of the large bowel is advocated.

2. Earlier diagnosis may be effected by the proper utilization of careful abdominal examination, fecal analysis, and the study of all cases with secondary anemia.

3. Every patient with blood in the stool should be subjected to digital rectal examination, sigmoidoscopy, and barium enema study in this order.

4. The majority of tumors of the large bowel are within reach of the examining finger or of the inspecting sigmoidoscope.

5. Permanent abdominal colostomy can usually be managed without discomfort, distress, and embarrassment of the patient.

6. Consideration should be given to the utilization of primary anterior resection with end-to-end anastomosis in those tumors which lie above the dependent portions of the pouch of Douglas in the rectum, rectosigmoid and the lower sigmoid colon.

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EMERGENCY DISINFECTION OF WATER

Emergency chlorination may be accomplished by dissolving 1 heaping tablespoonful of chloride of lime (approximately ½ ounce) to 2 gallons of water. This will give a stock chlorine solution having a strength of about 470 ppm. To disinfect the water to be used for drinking, add the stock chlorine solution to it in the ratio of 1 part of stock chlorine solution to 100 parts of water to be disinfected. A period of 30 minutes should be allowed between treatment and use. The treated water may have a distinct chlorinous taste but will not be harmful. The taste may be removed by dissolving a small crystal of sodium thiosulfate in the water after it has been in contact with the chlorine for 30 minutes. . . .

Iodine disinfection may be accomplished by adding 2 drops of tincture of iodine (7 percent) per quart of water and allowing it to stand 30 minutes before use. Iodine may impart a medicinal taste to water which may be removed, after the water has been allowed to stand for the 30-minute period, by the addition of sodium thiosulfate solution (7 percent) in an amount equal to the quantity of iodine which was used. . . .

Boiling for 5 minutes is a simple and effective emergency measure for disinfecting water.—Individual Water Supply Systems. Federal Security Agency, Public Health Service. U. S. Government Printing Office, Washington, D. C., 1950.

The Rule of the Artery—Its Surgical Significance*

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The osteopathic profession has throughout its history based many of its practices on two very well known dicta of Andrew Taylor Still, namely: "The rule of the artery is supreme" and "Pathology cannot exist in an organ with a normal blood supply." Most osteopathic therapy, manipulative or otherwise, is directed along these lines. Rapid advances in the vascular surgical field have brought into sharp focus the basic osteopathic concept. This can be of great advantage to osteopathic physicians and surgeons the country over, providing we seriously study and observe the effects of deficient blood supply on body tissues. This study must be in the form of well-organized basic research combined with acute clinical observation. Obviously the profession must enhance its research program in the colleges and train its clinicians to diagnose organic pathology accurately and to observe understandingly the effects of intelligently applied therapy to increase circulation, whether it be osteopathic manipulative, medicinal, or surgical therapy.

Failure of an organ to receive a proper blood supply must be due to one or more of the following factors:

1. Congenital vascular defects
2. Low red blood cell or hemoglobin percentages
3. Cardiac deficiencies or failure
4. Generalized or localized vasospasm
5. Organic disease of the arteries themselves with intravascular thrombosis
6. Arterial trauma.

It is not the writers' intention to minimize the importance of the manipulative and medicinal approaches to these problems as most, if not all, modern vascular surgery would be impossible without mechanical and medicinal aid and cooperation. However, this presentation will be limited to a discussion of surgical remedial measures for increasing blood supply.

CONGENITAL VASCULAR DEFECTS

There are two main types of congenital vascular defects, namely, congenital heart lesions and congenital arteriovenous fistula of the peripheral vessels. Both of these conditions seriously endanger life and should be surgically corrected when possible. Present-day cardiovascular surgery started 12 years ago with the monumental work of Gross[1] who first tied off a patent ductus arteriosus and opened a new field of surgery. Coarctation of the aorta and pulmonic stenosis have since been successfully cured or alleviated. These surgical advances are possible due to: (1) Improved methods of diagnosis such as angiography and cardiac catheterization, (2) improvements in control of infection with newer and better antibiotics and chemotherapeutic measures, (3) improvements in controlled anesthesia such as the endotracheal closed system, and (4) improvements in technic of blood administration such as intra-arterial transfusion.

*Presented at the meeting of the American College of Osteopathic Surgeons, Des Moines, Iowa, October 15-19, 1950.

The lethal complications of acquired cardiovascular conditions such as mitral stenosis and coronary artery disease are being attacked by experimental work today with the aid of anticoagulant drugs, artificial hearts, cardioscopy, and improved surgical technics. The future of vascular surgery to control vascular supply looks very promising.

Congenital arteriovenous fistulas are abnormal communications between peripheral arteries and veins. Mild forms are seen as port-wine blemishes and cavernous hemangiomata. At times the condition is present at birth and an entire extremity may be involved so severely with multiple fistula that amputation is necessary. The arterial and venous systems in the extremity communicate normally during fetal life, but close during the last months of pregnancy. If this closure consists of immature or inadequate cells, it may break down suddenly in later life producing a condition which resembles rapidly developing varicose veins, but which is in reality arterial varices or multiple arteriovenous fistula. This condition is being better recognized and improved technics of resection of involved areas have been developed to eliminate the underlying pathology more adequately.

LOW RED BLOOD CELL OR HEMOGLOBIN PERCENTAGES

The effects of the primary and secondary anemias on the general nutrition of the body are obvious and their relief or correction is of great importance in the field of general medicine.

The minor surgical procedure of intra-arterial transfusion has greatly minimized the dangers of great vessel surgery, where exsanguinating hemorrhage is always a possibility. It has also proved to be of inestimable value in the control of pre-existing oligemic shock. Immediate surgical attack is now possible on a patient suffering from continued internal hemorrhage such as bleeding esophageal varices or peptic ulcer.

We, as physicians and surgeons, have all at one time or another encountered a patient in oligemic shock. At this time we are aware of the need for speed of action to relieve the shock syndrome. Furthermore, we must not only act quickly but also effectively. To depend upon intravenous transfusion under these circumstances may cost a life while use of the relatively new method of intra-arterial infusion may save a life. The procedure is simple and the apparatus readily available.

One theory concerning the employment of intra-arterial infusion in the rapid treatment of oligemic shock will be given. It has become accepted as fact that vasoconstriction of the peripheral arterial system, vasoconstriction in the kidneys, and perhaps even some resistance to blood flow in the liver occur during shock. In the coronary circulation a decrease in blood flow has been experimentally demonstrated. Therefore, when the renal circulation is impaired it may be theorized that the renal vasopressor system, comprising renin, renin substrate, and angiotonin, is altered. The renin from the kidneys exhausts renin substrate preventing the formation of angiotonin or hypertensin and thereby deprives the body of its com-

pensatory mechanism against the hypotension of oligemic shock.

When blood is forced into an artery, such as the femoral, at known pressures, it is presumed to cause a vascular reactivity and the blood is carried back by way of the right heart and lungs, first to the kidneys and secondly to the coronary and medullary vessels.

The principle of giving blood by artery extends well into the annals of physiology. Giving blood via the artery instead of the venous route has at least three advantages: (1) Blood pressure is restored to normal within a few minutes and the rate of infusion is controllable. (2) Blood volume deficits are automatically corrected, that is, the amount of blood will be taken into the circulation which is required to fill it at a given arterial pressure. (3) When the heart and respiration have failed, blood given into the artery often brings about resuscitation.

The technic of administration of intra-arterial fluids can be readily mastered. If, for example, the patient's blood pressure is 30 mm. Hg or less, the pressure in the Kelly flask containing the blood for transfusion should be kept at 20 mm. Hg above that reading or at 50 mm. Hg. The blood will then flow into the artery. The pressure in the flask should be kept at 20 mm. Hg higher than the patient's systolic pressure at all times during the infusion until a maximum of 120 mm. flask pressure is reached. It is seldom desirable to exceed 120 mm. Hg as irregularities of the heartbeat and signs of embarrassment of the circulation may develop at higher pressures.

It may be said that arterial transfusion has a specific and definite application and in certain circumstances, such as deep shock or exsanguination, it may serve as an invaluable lifesaving procedure.

CARDIAC DEFICIENCIES OR FAILURE

Vascular surgeons are today vigorously attacking the problem of coronary occlusion and congestive failure of both the left- and right-sided types. The problem of coronary occlusion has been approached from two standpoints: attempts to (1) relieve the pain of angina pectoris and (2) establish artificial collateral circulation to the heart.

Anginal pains are usually eliminated by autonomic blockade from the second to the fifth thoracic ganglia with regional anesthesia with paravertebral injections of 2 per cent procaine. In severe disabling anginal cases, high thoracic sympathectomy is indicated. However, the surgeon must always remember that the pain of angina is one of nature's warnings against overtaxing a damaged heart and relief of pain carries some risk that the patient's life may be shortened, even though made more bearable.

Various surgical procedures have been advocated and used in attempts to increase collateral circulation to the heart after coronary occlusion. These procedures carry high mortality rates and with the decrease in the mortality following therapy of coronary occlusion with the use of anticoagulant drugs, it is questionable if any of the five procedures listed below are indicated today except in isolated cases:

1. *Cardio-Omentopexy.* — O'Shaugnessy[2] utilized the omentum as a graft to the ischemic area of the heart.

2. *Pectoral Muscle Transplant.* — Beck[3] used a pedicle flap of pectoralis major muscle sutured directly on to the heart.

3. *Cardiopneumopexy.*—Lezius[4] excised the pericardium and allowed the heart to become adherent to the lung.

4. *Pericardial Adhesions.*—Thompson[5] used powdered talc within the pericardium to stimulate adhesions and revascularization.

5. *Vein Transplant.*—Beck[6] has reported on the use of a vein graft from aorta to coronary sinus. This procedure is by far the most promising to date.

In the treatment of right sided heart failure due to intrapulmonary or extrapulmonary obstructions such as massive pulmonary infarctions, cor pulmonale syndrome, or severe mitral stenosis, reports on the creation of a shunt between the pulmonary artery and the azygos system of veins are promising. The increased pressure area is shunted toward the periphery via the azygos system. Recently the writers have noted that ligation of the inferior vena cava produced striking alleviation of right-sided heart failure occasioned by large pulmonary infarctions. Two cases of this type have been observed in the past 2 months. The caval ligations were performed to prevent further pulmonary embolic phenomena from thromboembolic disease of the lower extremities. However, the relief of the right-sided heart failure was dramatic and gratifying in both cases. These observations lead us to conclude that possibly caval ligation, through an abdominal approach, may force enough venous blood into the periphery and into the azygos system of veins to result in a definite volumetric decrease in the work load of the right heart. Research and animal experimentation should be carried out on this problem. If right-sided heart strain can be minimized by the simpler caval ligation as compared to the more difficult pulmonary azygos shunt procedure, many lives could be saved or prolonged.

LOCALIZED OR GENERALIZED VASOSPASM

The recent discovery of the true role of the autonomic nervous system has revolutionized our concepts of most vascular problems. Vasospasm, either localized or generalized, is activated by exposure of the organism to some tactile, thermal, emotional, mechanical, or chemical irritation which results in a decrease in the caliber of the peripheral vessels. This is due to some condition inherent in the arterioles and/or abnormal reaction of these arterioles to sympathetic stimulation. If the vasospastic influence is continued for a sufficient period organic vascular damage will result. In fact, if one eliminates as causes of death infectious disease, malignancy, and fatal trauma, most human fatalities are directly or indirectly the result of vasospastic influences. Likewise, all organic vascular diseases have their vasospastic component due to local mechanical irritation to the blood vessel wall.

Raynaud's syndrome, scleroderma, frostbite, pernio, and causalgia are representative of vasospastic problems with or without secondary organic change. On the other hand, thrombo-angiitis obliterans, arteriosclerosis obliterans, and thrombotic or embolic arterial occlusions are representative of organic occlusive arterial problems with variable degrees of secondary vasospasm which aggravate the primary problems.

The leading cause of death in this country today is essential hypertension, with its fatal sequelae of damaging and lethal cardiac, vascular, renal, and cerebral problems. Page[7] reports that 90 to 95 per

cent of all cases of hypertension belong in the essential group. It is well known that blood pressure is fundamentally controlled by:

1. Cardiac output
2. Volume and viscosity
3. Arteriolar resistance offered to the flow of blood.

In essential hypertension neither the cardiac output nor the viscosity of the blood is altered. Thus we have left arteriolar resistance or generalized vasospasm. Autonomic blockade, using Etamon chloride (tetraethylammonium chloride) and Priscoline (benzyl 45 imidazoline hydrochloride), is definitely indicated in the diagnostic and therapeutic management of this disabling and lethal problem. It enables the clinician to demonstrate diagnostically the degree of reversibility of the hypertensive reaction. Evaluation of the peripheral vasospastic versus the organic vascular factor is possible following the use of pharmacological autonomic blocking agents. If reversibility is demonstrated, the clinician should then carefully evaluate his patient for sympathectomy according to the following general criteria:

1. *Age.*—It is generally accepted that an apparent tissue age of over 55 years constitutes a contraindication.

2. *Vascular Status.*—Evidence of severe peripheral arteriosclerosis involving the extremities which indicates probable extensive arteriosclerotic changes elsewhere in the organism is a contraindication.

3. *Cerebral Status.*—Evidence of repeated cerebral damage as exemplified by marked mental deterioration, small stroke syndrome, hemiplegia, or severe retinal arteriosclerotic or hemorrhagic change is a contraindication.

4. *Cardiac Status.*—Evidence of repeated coronary occlusive phenomena or electrocardiographic changes commensurate with severe coronary arteriosclerosis is a contraindication.

5. *Renal Status.*—If repeated kidney function and blood chemistry determinations demonstrate a renal function that is so hopeless that the patient's life expectancy from a renal standpoint is very poor, regardless of blood pressure level, then sympathectomy is contraindicated.

In reviewing the above criteria for sympathectomy the clinician should always remember that the patients who present these complications usually present an utterly hopeless future, as far as any reasonably normal life expectancy is concerned. Many of them are also suffering from severe disabling subjective symptoms. Thus the clinician should carefully weigh all the evidence. Only after he has done so should he arrive at a decision as to whether or not to grant to the patient a possible "stay of execution" from a vascular death sentence. The relief of symptoms from a well-performed thoracic or thoracolumbar sympathectomy in the advanced case is usually very gratifying to both patient and doctor, even when the blood pressure reading is not reduced to normal limits postoperatively.

ORGANIC DISEASE OF THE ARTERIES

In this lethal category are found all of the chronic degenerative pathologies which are taking such a frightening toll of the American population. Arteriosclerosis is the result of the aging of arteries. Essential hypertension results in early arteriosclerosis with premature vascular aging. The expression, "A man is as old as his arteries," probably still holds good, although present-day vascular surgeons are rapidly modifying the concept. Surgery by extirpation has probably reached its ultimate. Surgeons have removed portions of, or all of, various organs of the body. Newer and better technics for extirpation will probably be evolved, but the limit of removable organs has probably been reached. This leaves a large field for future surgical research, that is, the prevention or correction of pathology in organs by altering their blood supply by surgical measures. It is not necessary today to adopt the hopeless attitude that arteriosclerotic vessels are beyond repair so the involved extremity must be amputated, that the coronary arteriosclerosis is irreversible so infarction is inevitable, or that a large aortic aneurysm must rupture with fatal hemorrhage within the next 3 to 6 months. It is the writers' opinion that the following surgical procedures will greatly alter the present gloomy outlook:

1. Earlier sympathectomy in cases of essential hypertension to delay or prevent the "middle-aged death sentence"

2. Earlier recognition of thrombotic or embolic obstructions to major arteries with early institution of adequate thrombectomy or embolectomy

3. Recognition of the role of arterial vasospasm in organically obstructed arteries and its alleviation by adequate regional sympathectomy

4. Use of more and more shunt or by-pass vascular anastomotic procedures to relieve obstructive pathology

5. Use of venous grafts to replace diseased or obstructed arterial segments

6. Establishment of artery banks to make available replacements for obstructed or weakened areas of artery. It has been proved that human arterial grafts removed from fresh cadavers and kept under refrigeration for as long as 3 weeks will remain viable when sutured into a recipient. Large sections of aorta and femoral arteries have been so grafted with good results. Truly, the man of the future may live to be a lot older than his own arteries.

ARTERIAL TRAUMA

All that has been said immediately above applies to the surgical treatment of arterial trauma. Because of the suddenness of vascular catastrophes, nature does not have time to enlarge normal collateral channels, so vascular reconstruction is often immediately imperative if life or limb are to be preserved.

SUMMARY AND CONCLUSIONS

An attempt has been made to review the present-day field of vascular problems and the methods of surgical attack. The field is expanding so rapidly that it behooves the internist, the cardiologist, and the surgeon to study and think in terms of the "vascular concept." The osteopathic profession, under the joint sponsorship of the American College of Osteopathic Surgeons and the American College of Osteopathic Internists, should create a society for the study of vascular problems. This group should have facilities for clinical and experimental research. With the help of the basic science departments in the osteopathic colleges, such a plan would be workable.

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MORTALITY RATES

The death rate for females is decreasing more rapidly than the rate for males according to figures released recently by Federal Security Administrator Oscar R. Ewing. The announcement was based on estimates of 1949 mortality statistics compiled by the National Office of Vital Statistics, Public Health Service. Between 1940 and 1949, the death rate for the female population decreased 13 per cent while the rate for males decreased 7 per cent.

Mr. Ewing pointed out that the death rate for every age group has been declining since 1940, the greatest relative decreases occurring in the rates for the younger ages, the smallest in the older ages. The death rate for children 1-14 years, for example, decreased 40 per cent between 1940 and 1949, while there was only a 10 per cent decrease in the death rate for persons in the age group 65-74 years.

The death rate for males is higher than that for females in each of the age groups. The largest relative difference between the rates for males and females in 1949 was in the age group 15-24 years. In this age group, the rate for males exceeded the rate for females by 89 per cent. This is more than 3 times the percentage difference between the rates for males and females of this age in 1940. The percentage differences between the death rates for males and females in the other age groups over infancy have also increased but not as rapidly.

Hormonal Therapy in Arthritis*

J. B. RAPP, D.O.
Philadelphia

In the past few years the research workers and practicing physicians have been faced with the necessity of reorganization of their concepts of the etiology of arthritis, particularly rheumatoid arthritis, in the light of the experimental advances which were made showing the relation of some of these diseases to endocrine dysfunction. The older investigators attempted to rationalize bacterial etiology, but emphasis is now being placed upon a biochemical basis, particularly that involving the adrenal cortex.

In 1849 Addison[1] described the disease syndrome in humans resulting from diminution of adrenal activity. He noted the marked asthenia, anorexia, and pigmentation that took place and also how easily these patients succumbed to infection, various stresses of physical exertion, and changes in temperature. It has taken medical research workers the greater part of the intervening 100 years to reach any comprehension of the heavy role that the adrenal glands play in relation to health and disease.

In this paper I will endeavor to present to you a brief summary of the recent advances in the management of rheumatoid arthritis with the newer "tropic" hormones, adrenocortical preparations, and steroids.

CORTISONE[2]

As a result of the phenomenal relief and subsidence of symptoms which took place during pregnancy or during an attack of jaundice in cases of rheumatoid arthritis, workers reasoned that there existed a biochemical "antirheumatic substance" common to jaundice and pregnancy, which if found, would greatly improve the management of rheumatoid arthritis. Attempts were made to reproduce the effects of jaundice and pregnancy in order to obtain this "antirheumatic substance," but without too much success.

Later it was conjectured that the "antirheumatic substance" might be an adrenal hormone. This guess was enhanced by the knowledge that certain procedures such as general anesthesia or surgical operations which stimulate the adrenal cortices also produce a temporary remission of the symptoms of rheumatoid arthritis. Various forms of adrenal cortical fractions were used with varying success until finally a cortical extract with most promising results was produced. This cortical extract is known as Kendall's compound E (17-hydroxy-11-dehydrocorticosterone) which is now known as cortisone.

Hench and his coworkers at the Mayo Clinic carried out the original clinical tests on cortisone. In their preliminary report they make mention of marked reduction of stiffness of muscles and joints, lessened articular pain on motion, and reduced articular swelling within a few days after beginning treatment. Patients were able after a few days of treatment to get in and out of bed unassisted, rise from chairs, open doors with one hand, wring out wash cloths, and climb stairs, all of which they had been unable to do prior to the start of treatment. Other clinical effects included improvement in appetite, gain in weight, increased strength, and a marked sense of well-being.

From the laboratory standpoint the following facts were noted:

1. In every case the sedimentation rate was markedly reduced.
2. Where the serum globulin was increased, the concentration became lowered.
3. Where the albumin-globulin ratio was low or reversed, it became normal.
4. Urinary concentration of 17-ketosteroids were reduced.
5. Hemoglobin values were increased in anemic patients.
6. Erythrocyte counts were increased by 500,000 to 1,000,000 cells per cu. mm.
7. Biopsy of synovia of the knee 43 days after start of the injections showed biological evidence of healing as compared to the synovia of the same knee before injection.

ACTH[3]

For 75 years after Addison's description of the Addisonian syndrome in humans, a large amount of laboratory work was performed upon the adrenal gland, but almost entirely on animals. About 25 years ago Herbert Evans reported that the use of pituitary extract prevented adrenal atrophy after removal of the pituitary gland in animals. Following this report, more work was done to clarify the physiologic and metabolic role of the adrenal gland with the use of pituitary fractions, further revealing that the adrenal gland was responsible for allowing animals and humans to withstand the stress and strain of the environment.

Armour Laboratories started work on ACTH in 1938 in collaboration with Collip of McGill University. However, little progress was made until Sayers and Sayers developed a quantitative bioassay method about 4 years later. But 5 years passed before Armour's Research Department was able to produce enough of the hormone for adequate study in humans.

Research has shown that it is the adrenal gland which enables animals and humans to withstand the acute stresses of environment, such as burns, trauma, infection, heat, cold, starvation, and extreme physical exertion. This property is believed to be due to an endogenous ACTH stimulation of the adrenal gland which is referred to as the "alarm reaction." The ability to withstand stresses is limited, however, as eventually the adrenal gland becomes exhausted and its function decreases. It has been reasoned that the exhaustion of the adrenal glands during continued stress is not due so much to the lack of ability of the adrenal gland to secrete adrenal cortical hormone as due to the prolonged stress; the endogenous secretion of ACTH may not continue at a level sufficient to stimulate the adrenal gland.

As yet the surface has only been scratched in attempting to explain the response to ACTH in certain diseases.

CORTISONE AND ACTH

It is estimated that in this country up to January 1, 1950, about 160 cases of rheumatic disease had been studied using cortisone, and about 175 cases using ACTH. Boland[4] compiled information from many of the preliminary reports. Concerning cortisone he found

*Delivered at the Golden Anniversary Convention of the Pennsylvania Osteopathic Association, Philadelphia, September 22, 1950.

that the experience of investigators such as Freyberg, Holbrook, Rosenberg, and Boland parallels the findings of Hench and his associates. Also, with ACTH, the findings of Hench and his coworkers were confirmed without exception by Thorn, Rosenberg, Holbrook, Ragan, Grokoest, and Boots.

A great deal more work will have to be done before the matter of optimal dosages of cortisone and ACTH can be adequately worked out. To treat a moderately severe case of rheumatoid arthritis Hench and his coworkers found that 100 mg. of cortisone was required daily, with an initial dose of 300 mg. Small doses of 25 to 50 mg. were found to be ineffectual in severe cases. Hench also reported that intermittent treatment with periods of daily injections followed by several weeks rest from treatment has given good results in several patients, with less relapse after each period of injections.

Boland and Headley found dosages of 50 mg. daily sufficient to control mild and moderate cases and that 100 mg. administered every other day was as effectual as 50 mg. daily. Freyberg had good results in several cases using doses of 100 mg. three times weekly.

With ACTH remissions may take place with daily doses of 20 to 100 mg. It has been found to be more effective if used in small doses four times daily rather than in one large dose per day. The administration of 25 mg. four times a day on the first day and of 10 to 15 mg. four times daily thereafter will usually be sufficient to produce remissions, even in severe cases. It must be remembered that the potency of ACTH may vary in different batches and the dosage may have to be varied. After discontinuance of cortisone and ACTH there is usually a fairly prompt relapse of the disease, with rare exceptions.

Even though spectacular therapeutic successes have been achieved with cortisone and ACTH, we should not be deluded into thinking that with these substances generally available, rheumatoid arthritis will be completely conquered. Where the hormones have been given over a long period and in large doses, objective signs of hyperadrenalism have been observed in some cases. These are really "physiologic effects" rather than "toxic effects" and usually disappear upon cessation of the administration of the hormone. Also, with smaller doses of hormone these endocrine changes are not reported.

Some of the possible physiologic changes which may occur are rounding of the face, menstrual disturbances, and transient pretibial edema. Females, especially before menopause, seem to be more susceptible to side-effects because of their more complex gonadal structure. In view of possible complications, it is obvious that much longer periods of observation will be needed to assess their seriousness. At present we must be careful in accepting ACTH and cortisone into general usage unless we are prepared to render careful and comprehensive clinical and laboratory supervision.

STEROID COMPOUNDS

Ishmael and his coworkers[5] reported recently on their work with testosterone proprionate estradiol benzoate, and certain of their derivatives in rheumatoid arthritis. They noted lessening of pain and edema and improvement in mobility, appetite, mental outlook, weight gain, red blood cell count, and sedimentation rate. They admit, however, in their report, that they are not presenting a "treatment or cure," but merely adding to the work being carried on with other steroids, hoping eventually to eradicate the shortcomings of present day research on the subject.

This group treated a total of 90 patients for periods of 4 to 12 weeks. Classified as rheumatoid arthritis were cases of rheumatoid spondylitis, psoriatic arthritis, Felty's disease, Reiter's disease, and one case of erythema nodosum. Their results showed that 81 patients had remissions, 4 showed no response, and 5 responded erratically with periods of remissions and exacerbations.

They point out that results were mostly erratic until they developed better balance of the hormones and learned more about dosages, absorption time, and side reactions. It was found that testosterone propionate most effectively reduced the arthritis, probably due to its general metabolic effects; however, the writers deemed it unwise to use this hormone alone for longer than 4 weeks. After that period estrogenic steroids were added and the combination was continued for 3 weeks, after which pregnenolone was started and the dosages of the androgens and estrogens gradually reduced.

The writers were emphatic in their expression of disbelief that the steroids used had a specific antiarthritic effect; rather they are representative of the effects which nonspecific steroids exert on arthritis. The writers also warned against the possible dangers of the cumulative effects of long-range use.

PREGNENOLONE

Pregnenolone, a synthetic steroid compound, has recently come to the fore as an antiarthritic drug. It is not a new drug; it was discovered over 15 years ago. In recent years Pincus and Hoagland[6] demonstrated its ability to decrease fatigue by virtue of its power to cause retention of 17-ketosteroids. The 17-ketosteroids are secreted by the Leydig cells of the testes and by the adrenal cortex. Pincus and Hoagland administered pregnenolone to extremely exhausted fliers and improved their efficiency. They administered it to workers in a bayonet factory and increased their production 18 per cent.

Prompted by the ability of pregnenolone to reduce the excretion of 17-ketosteroids and the possibility of its being readily converted to other usable steroids, Davison and his coworkers[7] made a study of 30 patients (12 with ankylosing spondylarthritis and 18 with rheumatoid arthritis) who received from 50 to 300 mg. of pregnenolone a day. From their study they found that intramuscular injection of pregnenolone in adequate doses appears to bring about a remission of rheumatoid arthritis in a very short time, although in some cases response is delayed from 3 to 4 weeks. Patients with spondylarthritis showed a reduction of 17-ketosteroid excretion and increased spinal mobility where immobility was due to muscular spasm rather than to actual ankylosis.

Another group headed by Freeman[8] selected pregnenolone for clinical experimentation in rheumatoid arthritis. They also studied 30 patients. The subjects were given pregnenolone or pregnenolone acetate in 100 mg. tablets in dosages of 300 to 700 mg. daily, with an average of 500 mg. Duration of treatment was 6 weeks. Fifteen subjects showed major improvement, 11 moderate improvement, and 4 no improvement. No toxic effects were noted. A noteworthy finding was that relapse after discontinuation of pregnenolone

was slower than relapse after the discontinuation of cortisone or ACTH.

The following statements can be made with regard to pregnenolone:

1. It is readily available.
2. It is relatively inexpensive.
3. It is relatively free of toxicity.
4. It can easily be administered orally or parenterally.
5. Good results appear to last longer than those produced by cortisone and ACTH.
6. Its clinical effect is inferior to that of cortisone and ACTH.
7. It may serve to lessen the number of people needing the more expensive cortisone or ACTH.
8. It may possibly serve as an adjunct to help maintain improvement in those individuals who have previously been improved by cortisone or ACTH.

DESOXYCORTICOSTERONE ACETATE AND ASCORBIC ACID

Of recent interest has been the preliminary report of Lewin and Wassén[9] concerning the effects of injections of desoxycorticosterone acetate and ascorbic acid in rheumatoid arthritis. They treated a series of 9 patients, using for each an intramuscular injection of 5 mg. of desoxycorticosterone acetate followed immediately by an intravenous injection of 10 cc. of a 10 per cent solution of ascorbic acid (1 gram). The following is a description of the result of treatment as written by the authors and I quote:

> Five minutes after the injections the articular pain began to diminish and the articular mobility began to increase. Fifteen to thirty minutes later, the pain had practically disappeared and the mobility improved as much as the anatomical changes in the joints and muscular atrophy would allow. All the patients reacted in a similar way. In some cases the improvement was astounding. One of the patients was completely crippled by pain and contractures after rheumatoid arthritis for fifteen years: after *one* combined injection, she sat up with ease and moved her arms and legs about freely; all her pain had gone. It was noted that the skin became warmer and redder in the articular regions after the injection. Some patients became greatly exhilarated after the injections—more than one would expect from the mere relief of pain.
>
> The effect lasted from two to six hours, occasionally more than twenty-four hours. It seems as though it lasts longer with each further injection. In more acute cases one or two injections have been enough to banish the pain for two or three weeks (the present observation time).

Lewin and Wassén did not report any complications as a result of the treatment; however, they did pay special attention to the sodium and potassium intake of the patients. This is a highly significant and important point as desoxycorticosterone has a powerful ability to cause sodium retention with its consequent water retention, edema, increased blood volume, enlargement of the heart, and elevation of the blood pressure. Also, it may cause increased potassium excretion leading to cardiac arrythmias and shock-like conditions. Patients, therefore, should be kept on low sodium diets and, if potassium is found to be depleted, they should be kept on high meat diets.

Facts worthy of mention in connection with desoxycorticosterone are that it is inexpensive and that those cases which tend to respond favorably do so early. Thus the necessity for prolonging treatment in order to ascertain its effectiveness is unnecessary.

CONCLUSION

In view of the favorable and promising reports on hormonal therapy, we may now predict the clinical reversibility and control of rheumatoid arthritis, which only recently was considered a chronic progressive disease in which it was possible to achieve only a small percentage of success in control and treatment. Now, we may be confident that more will be learned about the hormonal relationship of rheumatoid arthritis and that striking remissions may be obtained and retained indefinitely. Meanwhile, let us continue to regard these hormonal preparations as "investigational drugs," and to assist our patients by the use of a well-rounded program consisting of agents which have been helpful in the past, namely, osteopathic manipulative therapy, rest, removal of foci of infection, dietary management, vitamins, exercises, orthopedic appliances, analgesic medication, chrysotherapy, and physical therapy.

603 Central Medical Bldg.

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INJURIES DUE TO HEAT AND LIGHT FROM ATOMIC BOMBS

Severe burns were caused both by the radiant heat from the explosion of the atomic bomb (flash burns) and from the fires that broke out in the wreckage (flame burns). The effects of visible light probably are not significant. Even those who looked directly at the burst apparently suffered only temporary dazzling and loss of vision, but no clear-cut evidence of harm was reported. Temporary blindness resulted when the intense light bleached out the substance within the eyeball called "visual purple," and persisted for several hours until the body could manufacture a new supply.

Where hemorrhages of the eye occurred, it was from the general systemic effects of nuclear radiation. Conjunctivitis was common, but this infection of the outer eye was caused by smoke and dust.—*Medical Aspects of Atomic Weapons*, Report prepared for the National Security Resources Board by the Department of Defense and the United States Atomic Energy Commission. U. S. Government Printing Office, Washington, D. C., 1950.

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INTRAMEDULLARY FIXATION OF FEMORAL FRACTURES

Last month the Department of Defense announced that an improved technic for the treatment of femoral fractures had been tried out for several weeks in Tokyo Army Hospital with satisfactory results. This technic is intramedullary fixation which, although far from new, has been the object of renewed interest and intensive research since some of its results were noted in German prisoners during World War II.

The intramedullary nail, by spanning the medullary canal and extending almost its entire length, effectively controls displacement, angulation, and rotation. The method has been one of gradual development. Lambotte, during the early years of the twentieth century, treated subtrochanteric fractures of the femur by insertion of a long screw through the greater trochanter. In 1918 Hey Groves reported the use of medullary nails in 3 cases. During the 1930's axial Kirschner wires were used by various men working in several countries. In 1937 the Rush brothers published the results of the use of Steinmann pins in ulnar and femoral fractures. In 1940 Küntscher described intramedullary nailing which has since been known as the Küntscher method and which was adopted for treatment of German war casualties.[1]

In October, 1947, the Office of Scientific Research and Development, Surgeon General's Office, authorized a grant for intramedullary fixation of all long bones and soon thereafter the fracture committee of the American Academy of Orthopaedic Surgeons adopted intramedullary fixation as a project.[2] Since that time much work has been done with various Army and civilian doctors participating in a clinical testing program.

Many advantages of the method are obvious. As the release from the Department of Defense points out, when the pin is in place it is possible for the patient to bear weight on his leg almost immediately although present Army practice requires him to rest for at least 2 weeks. At the end of that period the patient is able, with the use of crutches, to exercise and even do light work. The method avoids the joint stiffness and muscular atrophy which frequently result from external fixation. The patient's ability to walk early and to care for himself during convalescence is a potent morale factor and represents a great gain to the Army in terms of medical manpower and hospital space.

Transportation of service personnel with femoral fractures has always presented a problem. In emergencies patients in body casts are essentially helpless and they take up considerable space on planes, trains, and ships, and in hospitals. Moving patients with femoral fractures is greatly simplified by the use of intramedullary fixation.

The disadvantages of the method are also well known. According to Hugh Smith[2] local complications are bound to occur and include bent pins, migration of pins, distraction of fragments, insecure or incomplete fixation, and all the other untoward developments which may attend any technic requiring exposure of bones. Infection, which was observed to occur at an appalling rate in the German war prisoners, is always a possibility, but is considered likely in only a few cases with the use of proper surgical technic and the antibiotics. Shock is a threat.[3]

The method is limited in its applications. The femoral fractures in which it is indicated are mainly short, oblique, or transverse fractures in an area 3 inches below the lesser trochanter and 6 inches above the adductor tubercle—about one fracture in four. The procedure should be undertaken only in patients whose general condition is sufficiently good to warrant a major surgical intervention. The technic requires the skill of an experienced surgeon working under ideal hospital conditions.

The most common error is the insertion of a pin that is either too long or too short, or too big or too small in diameter. A loose pin does not provide adequate fixation. A pin tightly lodged or impinged in the medullary canal may result in "a very chastening experience." (Böhler's book[4] includes a section on "how to proceed if a medullary nail can neither be driven in further nor removed.") For these reasons considerable preoperative planning is necessary. There is no formula for determining the size of the medullary canal. Young athletic individuals with very large bones tend to have rather small canals. Small elderly women tend to have very large canals. Detailed roentgen study must precede operation.[2]

The study that has been under way since the end of 1947 has been productive of promising results. Smith,[2] in his February, 1950, report for the Committee on Fractures and Traumatic Surgery of the American Academy of Orthopaedic Surgeons, made some very interesting comments, among them, "To say that

1. Street, D. M.: Medullary nailing of the femur; comparative study of skeletal traction, dual plating and medullary nailing. J. Am. M. A. 143:709-714, June 24, 1950.
2. Smith, H.: Intramedullary fixation. J. Bone & Joint Surg. 32-A:464-465, April 1950.
3. Campbell's Operative orthopedics, edited by J. S. Speed and H. Smith. Ed. 2. C. V. Mosby Co., St. Louis, 1949, Vol. I, pp. 367-374.
4. Böhler, L.: Medullary nailing of Küntscher. Williams & Wilkins Co., Baltimore, 1948.

the results to date are encouraging would be an understatement. To make a final or conclusive report would be premature. . ." To those who might be uncertain about proceeding with this technic he said, "Given the proper indications, intramedullary fixation is the most effective form of therapy of many fractures of the shaft of the femur. That statement must now be modified a bit. This technique if applied to improperly selected cases, or if inefficiently or unskillfully carried out, offers more possibilities of trouble than any other." At the 1951 meeting of the Academy of Orthopaedic Surgeons Dr. Smith, with a year more of experience, was willing to say that this method "promises to be one of the great advances in the treatment of fractures of the long bones."

Eaton[5] recently expressed an opinion which is pertinent in relation to the work of civilian physicians whose practices do not provide occasion for handling numerous fractures. He said, "Technical difficulties abound in this procedure. For the surgeon who is called on to manage the occasional case of fracture of the shaft of the femur, this method offers little advantage."

In spite of some very obvious advantages of the method for the military physician and patient, its adoption as standard throughout the Army Medical Service must await further investigation. If intramedullary fixation continues to show good results over a reasonable length of time, it will then, according to the Department of Defense release, be considered for use throughout the Army.

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THE RADIOLOGY SUPPLEMENT

This issue of THE JOURNAL contains the Radiology Supplement contributed by the American Osteopathic College of Radiology. The papers included in the Supplement were presented at the 1950 meeting of the College. With their publication in THE JOURNAL they are made available to every osteopathic physician who is a member of the American Osteopathic Association and they become permanently accessible for reference. More papers which were presented at the 1949 and 1950 meetings of the College of Radiology, but which could not be accommodated in the space available in THE JOURNAL this month, will appear in later issues.

The lead article of the Supplement is the 1950 Trenery Lecture entitled "Peptic Ulcer: Its Roentgen Diagnosis and Surgical Indications." The lecturer, C. J. Karibo, has reviewed the recent literature and added his observations and illustrations. W. L. Tanenbaum brings to attention "Recent Advances in Atomic Medicine." Dr. Tanenbaum's attendance at classes of the Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tennessee, has made him particularly able to evaluate developments in the atomic field. "Pitfalls in Pediatric Diagnosis," by J. H. Grant, and "Tumors of the Anterior Mediastinum," by A. G. Reed, complete the Supplement.

This collection of papers cannot fail to interest every practicing physician. Utilization of the various forms of radiation has become so much a matter of routine that it is difficult to picture practice without their benefits.

Department of Professional Affairs

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LET'S MAKE THEM REALIZE

I realize that here I am talking to the people that least need a sales talk about membership. This fact is brought to my attention constantly in organization work. To you who constitute the membership of the American Osteopathic Association, and who by virtue of that fact receive the JOURNAL regularly, a lecture urging membership seems quite unnecessary. The members of the Association are carrying the professional load physically and financially, and yet the nonmembers continue year after year to reap the harvest. Unless one is endowed with an extremely charitable nature, this fact sooner or later becomes annoying.

For a long time I have tried to analyze the problem of how to disseminate information to the osteopathic physicians who really need the Association's help and how to bring them into their proper place in our professional organization.

As members, we must pledge ourselves to contact these nonmembers personally and persuade them to become members, thereby helping themselves as well as the Association. You will encounter those who have the feeling that the Association is run by a few publicity-eager physicians who glory in leadership and like to see their names in print and their pictures on covers.

The statement is frequently made that a clique runs the affairs of the Association. Actually, you know and I know that the only prerequisite to belonging to that "clique" is to "stick your neck out" and show a willingness to give time and effort. Too many argue for the rights and forget the responsibilities that must play an important part in professional lives.

You will also meet the individual who says, "I'm too busy." You can only say of this man that he is either totally unaware of what is going on or that he has implicit confidence in those who have been elected to office. Surely, unless he has closed his ears and eyes to his surroundings, every osteopathic physician should realize that every day of the year decisions are being made—important decisions by the elected officers of the A.O.A. that vitally affect his practice rights, whether he is a member or nonmember.

The doctor who has chosen to gamble and ride along the membership coattail must be made to realize that his practice, his home, and even his family depend desperately on organized osteopathy and the correct judgment of its officers. Let him know that he may have a vital part in the making of the decisions by joining the American Osteopathic Association.

DONALD M. DONISTHORPE, D.O.

MEMBERSHIP REPORT

Membership Count as of March 1, 1951.....7,900

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TAX EXEMPTION OF HOSPITALS

A Supreme Court decision in the State of Ohio should be of more than passing interest to administrators and physicians interested in the operation of hospitals. In its decision in *Cleveland Osteopathic Hospital v. Zangerle,* 153 O.S. 222, 91 N.E. 2d 261 (1950), the Supreme Court of Ohio affirmed the decision of the Board of Tax Appeals of Cuyahoga County, Ohio, in denying to the Cleveland Osteopathic Hospital, an Ohio corporation not-for-profit, an exemption from taxation for the real estate taxes for the year 1949 on the property on which the west side branch of the hospital, called the Bay View Hospital, was located. The basis for the decision of the Board of Tax Appeals was that the property was not used exclusively for charitable purposes.

The evidence offered at the hearing before the Board of Tax Appeals on the application for exemption disclosed that six or seven osteopathic physicians and surgeons voluntarily withdrew from private practice and became employees of the hospital at fixed salaries. These physicians continued to see and treat patients at the hospital and elsewhere much as they had done when they were in private practice, but the hospital became the recipient and beneficiary of all fees and charges for their services. A witness for the hospital testified that profits made from the operation of the hospital had been, in the past, and would be, in the future, applied toward paying off the indebtedness of the hospital and in enlarging the hospital facilities.

The Supreme Court justices divided in reaching a decision on this case, four justices favoring the affirmance of the decision of the Board of Tax Appeals denying the tax exemption, and three justices dissenting from the majority decision. The majority decision in part, minus legal citations, is set out below:

ZIMMERMAN, J. On the present appeal, it becomes the duty of this court to decide the ultimate question whether *under the evidence adduced in this particular case,* the decision of the board is unreasonable or unlawful.

In the hearing before the board and on the presentation of this appeal, the hospital relies wholly on that part of Section 5353, General Code, which reads:

"Real and tangible personal property belonging to institutions used exclusively for charitable purposes, shall be exempt from taxation."

Based on the theory that all property should bear its proportionate share of the costs of government and property should be absolved from such obligation only for good cause, taxation is the rule and exemption the exception. Hence, one seeking to have property relieved from taxes has the burden of showing that such property comes squarely within the intent and meaning of exemption provisions. . .

It seems obvious that no single test is dispositive of whether a hospital, for example, is being conducted *exclusively* as a charitable project. All the facts in each individual case must be assembled and examined in their entirety and the substance of the scheme or plan of operation exhibited thereby will determine whether the institution involved is entitled to have its property freed from taxes. . .

To the writer, at least, the adjective "charitable" attached to "hospital" conveys the idea of a place where service and assistance are given the sick, injured and ailing, with open doors and benevolent concern for afflicted souls who lack the ability to pay for the attentions they receive.

Predicated upon language used in the opinion in the case of *O'Brien, Treas., v. Physicians Hospital Assn.* . . and in accordance with the concept of an organization devoted *exclusively* to charitable purposes, a hospital to qualify as a charitable institution, the property of which is exempt from taxation, should have as an important objective the care of the poor, needy and distressed who are unable to pay, although the fact that it admits and ministers to a number of pay patients will not necessarily destroy its charitable character. . .

But where a hospital extends its facilities and services very largely to those who are able to and do pay the established rates for their accommodation and *designedly makes a very substantial profit* in so doing, it places itself in the classification of a business enterprise amenable to taxation, notwithstanding that some unfortunate persons without means are cared for free of charge.

In the instant case it is plain from the figures presented that services and accommodations of all kinds for which charges were made and collected greatly exceeded the services performed and the accommodations furnished without charge and that by the procedure adopted and followed the pecuniary gain to the hospital was considerable.

The bare fact that a hospital devotes the profits it makes from the conduct of its affairs to paying off indebtedness and to improving and enlarging its plant does not of itself place it in the category of a tax exempt charitable institution. It is the use of the property and not the use of the proceeds derived therefrom which is determinative of the question of tax exemption. . .

One recognized test for ascertaining whether a hospital is charitable or otherwise is whether it is maintained and conducted for gain, profit or advantage. . . And this is a question of fact in each individual case. . .

It has been held that if the books of a hospital show a substantial profit, that is a circumstance tending to negative the idea that it is a benevolent institution. . .

In 2 Restatement of Trusts, 1167, Section 376, under Comment b., is the following language:

"The mere fact that persons who are not objects of charity incidentally benefit from the maintenance of a charitable institution does not prevent the institution from being charitable. Thus, an institution for the promotion of charitable purposes is charitable although salaries are paid to its managers, officers and employees. *If, however, the fixing of a salary is merely a device for securing the profits of the institution and not merely compensation for services rendered, the institution is not a charitable institution.*" (Italics supplied.)

Here, the compensation paid the physicians and surgeons working as employees of the hospital was a good deal less than the returns which the hospital enjoyed by reason of the services performed for its benefit by such physicians and surgeons. As a matter of fact, the amounts collected by the hospital for these services contributed in an appreciable degree to the tidy profit it garnered in 1948.

As concerns the problem of tax exemption in Ohio, cases from other jurisdictions are ordinarily not very helpful, because, more often than not, the tax-exemption provisions under which they were decided differ materially from the provisions on the same general subject obtaining in this state.

In the pending controversy, the Board of Tax Appeals found as a fact that the use made of the property for which tax exemption is sought did not bring it within the applicable exemption provisions of Section 5353, General Code, and rendered its decision accordingly. A majority of this court is of the opinion that such decision is not unreasonable or unlawful, under all the facts and circumstances developed, and it is therefore affirmed.

Justice Taft wrote the dissenting opinion for the court and stated therein the facts in the case as supported by the record and the findings of the Board of Tax Appeals. In particular, these facts evidence that the physicians had made the financial arrangements with the not-for-profit hospital in order to establish a means by which the hospital could secure a sufficient income to liquidate the institution's construction and equipment indebtedness incurred in purchasing the site of the hospital and remodeling the building and equipment. Justice Taft brought out that the Board of Tax Appeals had said that if the financial arrangements between the hospital and the physicians had not been made, the Board would have found the hospital entitled to tax exemption. He pointed out that the Supreme Court of Ohio had always recognized that the mere fact that a profit is realized from the operation of an enterprise does not mean that such enterprise is not operating exclusively for charitable purposes if such profit is devoted to the charitable purposes of the enterprise. This statement of the law coincides with that found in most other jurisdictions in this country. He pointed out that the State of Ohio is sorely in need of adequate hospital accommodations and that the words "charitable purposes" are usually understood "to include those purposes, the accomplishment of which is beneficial to the community." Justice Taft emphasized that in the instant case, if instead of devoting over one hundred thousand dollars of their services to the hospital in 1948, thereby permitting the hospital to make a profit in that year, the doctors had contributed this amount of money as a gift to the hospital "no question of its tax exemption could have been raised." He stated,

The interest of the community in having such a hospital is just as great where donations in cash are not available as where they are. That interest is the interest which justifies classification of the hospital as a charity and enables it to secure the tax exemption provided by the General Assembly.

Justice Taft concluded with a statement which will be of interest to hospital administrators and indicates an awareness

of the financial problems faced by the administrators of such institutions:

No institution, even a charitable one, can operate at a loss indefinitely. Where cash donations are not available to make up for operating losses, the need of tax exemption is greater than where such donations are available. The mere facts, that a hospital is operated efficiently within its income and supported in part by donations of services instead of cash, should not prevent it from receiving tax exemption. Any distinction between donations of money and donations of services would appear to be a distinction without a difference.

COMMITTEE ON CHRISTMAS SEALS

STEPHEN M. PUGH, D.O.
Chairman
Everett, Washington

1950 SEAL CAMPAIGN CONTRIBUTIONS

The contributions to the 1950 Campaign have exceeded those of every year since the institution of the concentrated Christmas drive in 1931. To date $15,788.61, of which 90 per cent goes for research and 10 per cent for continuation of the Student Loan Fund, have been received—a generous response, but not enough.

Research is expensive, but the dividends to the public and to the profession are great. As the research program develops, more and more funds will be needed. If every osteopathic physician contributes and if he makes the research program known to his patients and friends, the need can be filled. Seventy-six per cent of gifts for philanthropic purposes come from middle-income groups, the same groups which include most osteopathic physicians and their friends and patients. If every physician will do his share in giving and in bringing osteopathic research to the attention of those about him, it will be possible to go ahead with the work even if it is expensive. Gifts to the Seal Campaign are welcome at any time.

The results of the 1950 Campaign are as follows:

REPORT TO DATE OF CONTRIBUTIONS TO 1950 CHRISTMAS SEAL CAMPAIGN
(From November 21, 1950 to February 28, 1951)

Classification of Contributors	Number	Total Amount
Osteopathic Physicians	2,664	$ 8,811.76
Colleges (Osteopathic)	5	915.56
Hospitals (Osteopathic)	89	563.00
Auxiliary to A.O.A.		
a. Individual Members	683	1,139.75
b. District and Group Gifts		794.00
Laymen		
a. Contributions secured by Osteopathic Physicians from Patients and Friends	454	2,074.22
b. Students' Parents	380	1,089.40
c. Lay friends who have been contributing to Student Loan Fund for a number of years	107	240.10
d. Stamp Collectors	20	20.32
e. A.O.A. Central Office Staff		64.50
f. Miscellaneous (Divisional, District and Allied Societies, Fraternities and Sororities.)		66.00
TOTAL CONTRIBUTIONS		$15,778.61

Department of Public Relations

CHESTER D. SWOPE, D.O.
Chairman
Washington, D. C.

UNIVERSAL MILITARY SERVICE AND TRAINING

On January 17 the Secretary of Defense sent to the Chairmen of the Armed Services Committees of the Senate and House a draft of proposed amendments to the Selective Service Act, cited as a bill for Universal Military Service and Training. The draft was immediately introduced in both Houses. In the Senate it is S. 1 (substitute amendment) and in the House HR. 1752.

In addition to retaining the Presidential power to grant deferments for persons engaged in activities necessary to the maintenance of the national health, safety, or interest under Sec. 6 (h) of the present Selective Service Act, the bill would permit the President during each of the next 3 years to temporarily remove from active training and service after they had completed an initial 4 months' training of not to exceed 75,000 persons to permit them "to engage in study or research in medicine, the sciences, engineering, the humanities, and other fields determined by him to be in the national interest and while so engaged such persons shall not be deemed to be in military service (active or inactive) for any purpose." After the osteopathic testimony, the Senate Committee revised the provision to read: "to engage in study or research in medicine, *osteopathy*, the sciences, engineering, the humanities, and other fields determined by him to be in the national interest and while so engaged such persons shall not be deemed to be in military service (active or inactive) for any purpose." They would be deferred from the obligation to complete the period of military service until completion of such study or research. Upon the end of that deferment, they could at any time within 10 years thereafter be reordered into active service for the unserved period of service, unless they perform other military or civilian service in the national interest for an equivalent period.

Due to inclusion of the above provision for 75,000 students, the bill repealed that section of the doctor draft act which declares it is the sense of Congress that premedical, preosteopathic etc. students be deferred. The repealer has been deleted.

AOA testimony before the Senate Committee holding hearings on the bill was as follows:

STATEMENT BY LAWRENCE L. GOURLEY, LEGAL COUNSEL, AMERICAN OSTEOPATHIC ASSOCIATION, ON S. 1 (SUBSTITUTE VERSION), THE UNIVERSAL MILITARY SERVICE AND TRAINING ACT, BEFORE THE PREPAREDNESS SUBCOMMITTEE OF THE SENATE COMMITTEE ON ARMED SERVICES

January 30, 1951

The American Osteopathic Association appreciates the opportunity to comment on the pending bill S. 1, cited as the Universal Military Service and Training Act.

There are in excess of 11,000 osteopathic physicians or surgeons in the United States. Some 350 hospitals with a bed capacity in excess of 8,000 are staffed by doctors of osteopathy. There are six colleges of osteopathy all approved by the American Osteopathic Association, and there are sixty-three intern training hospitals likewise approved by the Association.

The practice of osteopathy was listed by Federal agencies during World War II as a critical occupation and it is currently so included in the Labor List of Critical Occupations. Preprofessional and professional osteopathic students were deferrable during World War II in the same memoranda as medical, dental, and veterinarian students, and they are currently grouped together in Selective Service Local Board Memorandum No. 7 for the same purpose, on the ground that such fields are highly essential to the national health, safety, and interest.

We have three recommendations with respect to the pending bill.

RECOMMENDATION NO. 1

We request that there be inserted in the bill at the appropriate place a declaration that it is the sense of Congress that the President shall carry out the existing express authority for appointment, by and with the advice and consent of the Senate, of graduates of reputable schools of osteopathy as commissioned medical officers in the Armed Services.

Section 1 of S. 1 (substitute) amends the Selective Service Act (Sec. 1 (d)) with a Congressional declaration that adequate provision for national security requires maximum effort "in the fields of scientific research and development, health, and education, and the fullest possible development and utilization of the nation's technological, scientific, and other critical manpower resources."

Translating that declaration in terms of the osteopathic profession and its training institutions, it is taken to mean that physicians trained in the osteopathic school of medicine shall be used in their professional capacity for civilian and military service.

In 1946, Public Law 604, 79th Congress (60 Stat. 858), Congress expressly authorized the appointment of "graduates of reputable

schools of osteopathy as commissioned medical officers in the Navy." When graduates of colleges of osteopathy and surgery have applied, their applications have been rejected by the Navy in the following terms (excerpt from Navy letter of March 29, 1949, full text appended):

> The regulations governing appointment in the Medical Corps of the U. S. Naval Service require that candidates be graduates of medical schools listed as approved by the Council on Medical Education and Hospitals of the American Medical Association. The fact that you will not upon your graduation meet this latter requirement would preclude the favorable consideration of your application by this Bureau.

Such replies are tantamount to an extralegal delegation of power to the American Medical Association to determine the reputability of colleges of osteopathy and surgery. Such a purported delegation of power was expressly repudiated by the United States Senate on June 27, 1941, in connection with HR. 4965 (Public Law 139, 77th Congress, 55 Stat. 379). The occasion was a provision in that bill as it passed the House providing for the employment of interns of the Medical Department of the Army "who are graduates of or have successfully completed at least four years' professional training in reputable schools of medicine or osteopathy." The provision was objected to by the War Department for the reason that osteopathic colleges are not AMA approved. The Senate Committee followed the recommendation of the War Department by striking the provision from the bill and stating, in the words of the War Department, that: "Until schools of osteopathy are recognized by the American Medical Association as equal to the standard schools of medicine, their graduates are not acceptable for service in the Army." The Senate restored the provision to the bill and it became law, and the debate in the Senate condemned the attempted delegation of authority to determine the eligibility of osteopathic graduates for medical appointments.

Several State medical examining boards have made personal inspections of all osteopathic schools preliminary to examination of osteopathic applicants for unlimited licenses to practice medicine and surgery, and found them to be institutions furnishing training of comparable scope and quality with that provided in recognized medical schools.

When Congress in 1946, Public Law 293, 79th Congress, 58 Stat. 676, established a Department of Medicine and Surgery in the Veterans Administration, it provided that a person to be eligible for appointment in the Medical Service must "hold the degree of doctor of medicine or of doctor of osteopathy from a college or university approved by the Administrator, have completed an internship satisfactory to the Administrator and be licensed to practice medicine, surgery, or osteopathy in one of the States or territories of the United States or in the District of Columbia."

General Paul R. Hawley then Chief Medical Director of the Veterans Administration took the position that there could not be two standards of proficiency in the Medical Service, and that as soon as he could become satisfied of the equivalence of osteopathic and medical education he would recommend appointment of osteopathic applicants. After investigation, he was so satisfied and he did recommend appointment of osteopathic graduates. The Veterans Administration has approved all six colleges of osteopathy and the intern training hospitals for purposes of appointments in the Medical Service of the Veterans Administration, and several osteopathic physicians are so serving.

All States license osteopathic graduates. Some States have osteopathic examining boards. Some have composite boards. In other States osteopathic and medical applicants take the same examination before the same State examining board. Three-fourths of the States provide for licensing of osteopathic applicants in all branches of the healing art and some or all of the profession are so licensed in each of those States. In the remaining States the licenses are limited in some respects, notwithstanding the generally recognized adequacy of their training as evidenced in the regulatory laws of most States. It is worthy of note that the Navy during World War II made provision for and did commission in the Medical Corps of the Navy graduates of medical schools who were ineligible for medical licensure in most of the States, and they apparently rendered the usual high quality of service which is characteristic of the Medical Corps of the Services.

In the early part of World War II the Director of Aviation Training of the Navy made the following recommendation:

> . . . In addition to a regular sick bay or hospital staff, one or two sports physicians should be attached to the athletic staff to administer to the bruises, sprains, etc., as well as to consult on matters of posture, instruct in matters of camp hygiene, etc. A staff of trainers should work under the direction of these sports doctors. At the risk of being branded for heresy, I further recommend that one of these sports doctors be an osteopath or one fully acquainted with osteopathy methods.

The Armed Services have not at any time contended that they do not have the authority to change their regulations so as to commission doctors of osteopathy in the Medical Corps. Yet the Congress has seen fit to expressly declare the existence of that authority, and indicate the place where doctors of osteopathy are to serve, that is, the Medical Corps.

The Armed Services apparently consider these acts of Congress as mere gestures.

We therefore respectfully suggest that if the Congress shall deem the pending legislation an appropriate vehicle, and we suggest that it is, the Congress shall remove any doubt as to the purpose of the Acts of Congress providing for Medical Corps commissions for doctors of osteopathy by inserting in this bill emphatic language declaring that it is the sense of Congress that such authority shall forthwith be exercised.

RECOMMENDATION NO. 2

Instead of repealing paragraph 3 of Sec. 4 (i) as proposed in lines 1 and 2, page 8 of the bill, we recommend that the paragraph be revised to read as follows:

> (3) The President is authorized to provide for the annual deferment from training and service under this title, of a number of persons subject to the Act and who have been tentatively selected for admission to the freshman class by a school of medicine, dentistry, osteopathy, optometry or veterinary medicine, as will be sufficient to provide the maximum numbers in such entering classes which such professional schools can adequately train.

The suggestion is a restatement of the current provision of the law with the addition of language calling for tentative selection of the preprofessional students by the professional colleges in sufficient number to supply the entering classes in the professional schools. The additional language in effect follows the procedure already ordained and in practice under Selective Service Local Board Memorandum No. 7. We suggest that nothing should be left undone consistent with the public interest to insure an adequate flow of trainees in preparation for the healing arts.

RECOMMENDATION NO. 3

We recommend that the bill be amended by inserting the word "osteopathy" after the word "medicine" in line 18, page 9.

This is the section which allows the President to temporarily remove from active training and service 75,000 persons annually to permit such persons to engage in study or research in medicine, and other fields. Under Selective Service LBM No. 7 preprofessional and professional students of medicine, dentistry, osteopathy and veterinary medicine are deferrable. The failure to include osteopathy along with medicine in this provision of the bill encourages a narrow construction of the term medicine to the point of possibly excluding osteopathic medicine. We ask for a resolution of the ambiguity by specific inclusion.

We understand that the language in the bill allowing government officials or agencies to make the selections is to be revised in such manner as to permit the professional schools a determinative voice in the selection of preprofessional and professional students. Such a procedure would be in consonance with Selective Service LBM No. 7.

The osteopathic colleges and the Selective Service System have successfully cooperated under LBM No. 7 and we strongly suggest that nothing in this legislation shall interfere with the continued effectiveness of LBM No. 7.

DEPARTMENT OF THE NAVY COPY
BUREAU OF MEDICINE AND SURGERY

BUMED-3424-EC
29 Mar 1949

Raymond Klevansky
5970 Trinity Street
Philadelphia, Pennsylvania

Dear Mr. Klevansky:

This will acknowledge your letter of 22 March 1949 regarding the availability of an Internship in a U. S. Naval Hospital upon your graduation from the Philadelphia College of Osteopathy.

The regulations governing appointment in the Medical Corps of the U. S. Naval Service require that candidates be graduates of medical schools listed as approved by the Council on Medical Education and Hospitals of the American Medical Association. The fact that you will not upon your graduation meet this latter requirement would preclude the favorable consideration of your application by this Bureau.

Sincerely yours,

(signed) A. H. Dearing

A. H. Dearing
Rear Admiral (MC) USN
Assistant Chief of Bureau for
Personnel and Professional Operations

ODM COMMITTEE ON MANPOWER POLICY

On February 9, 1951, Charles E. Wilson, Director, Office of Defense Mobilization, announced the appointment of Dr. Arthur S. Flemming, president of Ohio Wesleyan University, Delaware, Ohio, as Assistant to the Director in charge of Manpower Problems. In this capacity, he will preside for the Director in the meetings of the ODM Manpower Policy Committee.

The Manpower Committee was established by issuance of Defense Mobilization Order No. 5. Besides the Chairman, it is composed of seven members. They are the Assistant Secretary of Defense concerned with manpower; representa-

tives of the Departments of Agriculture and Labor; Director of Selective Service; Chairman of the Civil Service Commission; Deputy Administrator of the Defense Production Administration, and the Chairman of the Wage Stabilization Board of the Economic Stabilization Agency.

The Housing and Home Finance Administrator and the Federal Security Administrator will be brought in on problems involving housing and community services.

Defense Mobilization Order No. 5 reads as follows:

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF DEFENSE MOBILIZATION

DEFENSE MOBILIZATION ORDER NO. 5
CREATING A COMMITTEE ON MANPOWER POLICY

By virtue of the authority vested in me by Executive Order 10193, and in order to assist the Director of Defense Mobilization to improve the coordination and effectiveness of Federal policies and programs relating to manpower, it is hereby ordered:

1. There is established in the Office of Defense Mobilization the Manpower Policy Committee, which shall consist of a Chairman, the Assistant Secretary of Defense primarily concerned with manpower, a representative of the Department of Agriculture, a representative of the Department of Labor, the Director of the Selective Service, the Chairman of the Civil Service Commission, the Deputy Administrator of the Defense Production Administration, and the Chairman of the Wage Stabilization Board of the Economic Stabilization Agency. The Chairman of the Committee shall be designated by the Director of Defense Mobilization. For those problems involving housing and community services the Chairman shall add, for the purpose of such discussion, the Housing and Home Finance Administrator and the Federal Security Administrator.

2. The Manpower Policy Committee shall:

a. Advise the Director of Defense Mobilization on problems relating to manpower, including the allocation of manpower to meet civil and military requirements.

b. Review Federal policies, plans, and programs relating to manpower and formulate recommendations for the Director of Defense Mobilization to improve their coordination and effectiveness.

c. Review and formulate for the Director of Defense Mobilization proposed legislation and Executive Orders, and administrative orders and regulations relating to manpower.

3. This order shall take effect on February 8, 1951.

OFFICE OF DEFENSE MOBILIZATION
Charles E. Wilson
Director

BLOOD COLLECTION

Because of the grave international situation, a greatly intensified medical research program to develop more effective means for collecting, preserving, and using blood and its fractions and more knowledge of the medical value of the various components of blood has been launched by the Federal Government and a number of medical schools and other nonfederal institutions, Federal Security Administrator Oscar R. Ewing announced recently.

As a result of agreements among the several agencies concerned with the National Blood Program, the National Institutes of Health, research branch of the Public Health Service, has initiated the research and development phase of the intensified blood program. The various organizations concerned include the American National Red Cross, the National Research Council, the Federal Civil Defense Administration, the Department of Agriculture, the Department of Defense, the National Bureau of Standards, and various independent blood banks and state agencies.

In commenting upon the necessity for research in blood collection, preservation, and fractionation, Mr. Ewing said: "The priority importance of this program can be stated simply. In the event of atomic bombing or large scale attacks on U. S. cities by ordinary bombs, a large proportion of deaths both civilian and military, will come from shock, from burns and from hemorrhage. Plasma and plasma substitutes are essential, but in addition many thousands of cases will require whole blood."

Dr. Leonard A. Scheele, Surgeon General of the Public Health Service, elaborating upon this statement said: "At the present time, unfortunately, whole blood cannot be preserved for more than a few weeks. It therefore cannot be stockpiled, and we cannot count on sufficient donors, trained personnel or physical facilities for immediate blood replacement during the confusion of a major catastrophe. Therefore, research into the entire problem of blood-collection, preservation and fractionation, and the effects of blood fractions and blood substitutes on various types of injury . . . has become a matter of supreme importance to our national welfare."

To spearhead this research program, which will be administered by the National Heart Institute of the National Institutes of Health, Dr. Scheele said $600,000 has already been allocated as part of the National Blood Program's total first year's requirement. He estimated that funds from all sources to be spent during the first year of intensified research would total $2,000,000. In addition to the research in nonfederal institutions, work will be done in the laboratories of the National Institutes of Health, Naval Medical Research Institute, and in Army Hospitals. To aid in the developmental aspects of the program a special committee of both federal and nonfederal scientists has been established.

The $600,000 has been allocated for three closely related categories of research, Dr. Scheele said. In the first category of basic research, emphasis will be placed on the separation, purification, storage, and use of the various formed elements of the blood which can act as substitutes for whole blood. Among the formed elements, red cells can now be separated and preserved for only a short time. Preservation of these cells for much longer periods is necessary before stockpiling can become feasible. The separation and preservation of the blood's white cells and platelets are almost equally urgent research problems, according to Dr. Scheele.

The second major category, developmental research, consists of technical experiments designed to develop improved methods for blood collection. The Committee for Research and Development, headed by Dr. Charles A. Doan of Ohio State University, has been allocated $215,765 of the currently available funds for use in the field of developmental research. This sum will be used to adapt results of test-tube research to large scale production of blood fractions. Emphasis will be placed on the development of special equipment, such as centrifuges, refrigeration equipment, plastic equipment such as transfusion kits as substitutes for glass or metal which usually damage the separated elements of the blood, and on mobile processing equipment.

In the third major category, clinical research, Public Health Service funds will be used to support research which seeks to determine as rapidly as possible the relative effectiveness of the formed elements, whole blood, and blood substitutes in the treatment of burn, shock, and radiation injury.

FSA COMMITTEE ON AGING AND GERIATRICS

Federal Security Administrator Oscar R. Ewing on January 24, 1951, announced the appointment of Clark Tibbitts as Chairman of the Agency's Committee on Aging and Geriatrics. Mr. Tibbitts, Assistant Chief of the Division of Public Health Methods, Public Health Service, served as Director of the National Conference on Aging called by Mr. Ewing in Washington last summer.

Mr. Ewing explained that the Committee was the result of the President's letter of last June, asking him to explore with all appropriate groups, both within and outside the federal government, the problems arising from the increasing proportion of older persons in our population. This request has been made more urgent by the need to exploit the skills and capacities of older people as a matter of national security.

The Committee on Aging and Geriatrics working with private organizations and government agencies will have three major purposes: first, to develop methods for integration of older persons into our total mobilization effort; second, to continue the collection of information about the characteristics and potentialities of older people, about the problems experienced by them and their families, and about programs that are being developed to meet these problems; and, third, to satisfy the increasing demands, since the National Conference on Aging, for information and guidance to public and private organizations interested in fitting older people into active participation in normal family, social, and community activities.

Mr. Tibbitts' appointment culminates two decades of distinguished work on the sociological and educational aspects of the aging process. He is chairman of the Committee on Education for Aging of the National Education Association and

is a member of the National Committee on Aging, of the Gerontological Society, and of the Advisory Committee of the forthcoming Second International Congress of Gerontology.

As director of the Institute for Human Adjustment of the University of Michigan from 1938 to 1949, Dr. Tibbitts supervised its research-training-service program. Three years ago he organized and conducted at the University the first course on living in the later years and the first general conference on aging ever held in the United States. As a result of his pioneering work, the State of Michigan is preeminent for its educational work with the aging. These programs are now serving as the basis for related activities throughout the United States.

EXTENSION OF VETERANS REHABILITATION

On January 22, 1951, the Veterans Administration issued regulations outlining conditions under which veterans, disabled after fighting started in Korea, may be entitled to Public Law 16 rehabilitation training.

The training, previously limited to World War II veterans, was extended to many veterans disabled on or after June 27, 1950, by Public Law 894, signed by the President late last year.

Most of the policies and procedures set up under Public Law 16 itself have been carried over to the new training program. In fact, the newcomers apply for training on the same forms used by disabled World War II veterans.

Under Public Law 894, a veteran must have been disabled after the Korean conflict began and prior to a date yet to be fixed.

The new law requires that the disability be such that Veterans Administration may pay compensation at full wartime rates. Such rates are paid for disabilities or injuries resulting from armed conflict, or during extra-hazardous service, or while the United States is engaged in war.

Under the new law, the July 25, 1956, deadline for Public Law 16 training will not apply to the newly-disabled veterans. Instead, they will have 9 years from the end of the current emergency in which to train.

Public Law 894 states that veterans who already had GI Bill or Public Law 16 training, as a result of their World War II service, may be entitled to additional training, if found necessary because of new disabilities.

In determining whether such a World War II veteran needs training, and what type he should get, VA will consider his previous records of advisement and training as well as his current medical record. The reason is that previous training may be capitalized to the fullest extent practicable.

In the case of a veteran who interrupted Public Law 16 training to re-enter the armed forces, VA also will evaluate his past training record and present medical file, to determine whether he still is able to go ahead in the same employment objective.

ARMED FORCES MEDICAL POLICY COUNCIL ESTABLISHED BY DEFENSE DEPARTMENT

Establishment of an Armed Forces Medical Policy Council, as the principal agency of the Secretary of Defense in the field of medical and health services for the Armed Forces, was announced January 5, 1951, by the Secretary of Defense, General Marshall.

The new Council combines in one organization leading military and civilian medical and health authorities, under a civilian chairman.

Dr. Richard L. Meiling, who has been Director of the Office of Medical Services, Department of Defense, for the last 15 months, has been named Chairman of the Armed Forces Medical Policy Council. He will serve also as principal adviser and assistant to the Secretary of Defense on medical and health matters.

Other members of the Council are Major General Raymond W. Bliss, Surgeon General of the Army; Rear Admiral H. L. Pugh, Surgeon General of the Navy; Major General Harry G. Armstrong, Surgeon General of the Air Force, Dr. I. S. Ravdin, Philadelphia, Dr. W. Randolph Lovelace II, Albuquerque, N. Mex., and Dr. James P. Hollers, San Antonio, Tex.

The Council will develop basic medical and health policies for the Department of Defense and review those of the three military departments. It will collaborate closely with other defense agencies, such as the Joint Chiefs of Staff and the Munitions Board, where medical considerations are involved.

Among the responsibilities of the Council are:

1. Developing and establishing uniform or joint programs in the Army, Navy, and Air Force medical services, including joint utilization and cross-servicing of facilities

2. Reviewing medical phases of budget estimates and legal proposals

3. Initiating programs for standardization of various technical medical activities of the three services

4. Representing the Secretary of Defense in dealing with other governmental and nongovernmental agencies in medical and health matters of mutual interest; and

5. Developing close cooperation and mutual understanding between civilian and military medicine and the allied professions.

In the latter field, the three civilian members of the Council will insure active participation by civilian experts in developing broad medical and health plans for the Armed Forces.

Participation by the Surgeons General of the Army, Navy, and Air Force will enable the Council to evaluate overall plans in relation to tactical and strategic missions of the three services and to consider operating problems presented by each.

The Armed Forces Medical Policy Council incorporates in a single organization the services previously performed by the following: Armed Forces Medical Advisory Committee (composed of civilian physicians and dentists under the Chairmanship of Charles P. Cooper); the Office of Medical Services and the Director of Medical Services, Department of Defense; and the Military Medical Advisory Committee (formed by the Director of Medical Services and composed of the Surgeons General of the Army, Navy, and Air Force, the Chief Medical Director, Veterans Administration, and the Surgeon General, U. S. Public Health Service). These groups have been discontinued with the establishment of the Armed Forces Medical Policy Council.

VA CHIEF MEDICAL DIRECTOR

Vice Admiral Joel Thompson Boone, Medical Corps, United States Navy, Retired, has accepted appointment as Chief Medical Director of the Veterans Administration.

Admiral Boone will take over his duties at the VA by April 1, 1951. He succeeds Dr. Paul B. Magnuson whose resignation previously presented has been accepted effective January 15, 1951.

Assistant Chief Medical Director, Dr. Arden Freer, will serve as acting Chief Medical Director in the interim between the effective date of Dr. Magnuson's resignation and the time Admiral Boone takes office.

Admiral Boone is a veteran of both World War I and World War II. In the first World War he served with the Sixth Regiment of Marines and the Headquarters, 2nd Division, United States Army. He participated in four major engagements; a defense sector south of Verdun and the Aisne-Marne, Champagne, and Meuse-Argon offensives.

In World War II he served as Fleet Medical Officer, Third Fleet. He was the Naval Medical Corps Representative at the Japanese surrender ceremonies on the Battleship Missouri, and was one of three officers selected to liberate Allied prisoners of war in Japan.

In March of 1919, Admiral Boone was assigned as Medical Officer aboard the Presidential yacht Mayflower. In that

capacity, and later as physician to the White House, he served until 1933 as physician to Presidents Harding, Coolidge, and Hoover.

Dr. Boone was born in St. Clair, Pa. on August 29, 1889, the son of the late William A. Boone and Mrs. Annie Thompson Boone. He was graduated from Mercersburg (Pa.) Academy in 1909, entered Hahnemann Medical College in Philadelphia, where he was graduated in June, 1913. Appointed Lieutenant (jg) in the Medical Corps of the U. S. Naval Reserve in April, 1914, he was transferred to the Regular Navy in that rank in May, 1915. He advanced in grade to Rear Admiral, May 20, 1942, and upon retirement was advanced to the rank of Vice Admiral.

ARTHRITIS AND METABOLIC DISEASES

Dr. Russell M. Wilder has been appointed Director of the recently established National Institute of Arthritis and Metabolic Diseases of the Public Health Service.

Dr. Floyd S. Daft assumes the post of Associate Director of the new Institute.

Formation of the new Institute, as part of the National Institutes of Health, Bethesda, Md., was recently authorized by Congress to intensify basic research in arthritis, rheumatism, and such metabolic diseases as diabetes, goiter, peptic ulcer, and certain forms of anemia. The Arthritis and Metabolic Diseases Institute assumes the research functions, facilities, and personnel of the recently abolished Experimental Biology and Medicine Institute. Also, by means of grants-in-aid, it will support research in nongovernmental organizations and encourage individual investigators to undertake research in the same and allied fields.

Dr. Floyd S. Daft, the new Associate Director, is an authority in the field of nutrition. He is especially well known for his work on cirrhosis of the liver, the relationship of vitamin deficiencies to protein deficiencies, and the relationship of dietary deficiencies to heart and kidney diseases. In 1948, he became Chief of the Biochemistry and Nutrition Laboratory and Assistant Director of the Experimental Biology and Medicine Institute of the National Institutes of Health.

VA SURVEY

The Administrator of Veterans Affairs selected the management engineering firm of Booz, Allen and Hamilton of Chicago to conduct a study of Veterans Administration organization and operation.

The survey, which will extend over a period of approximately 14 months, will be for the purpose of determining whether changes in organization and operational procedures are necessary to provide the best possible service to veterans at the lowest possible cost.

The study, which will begin approximately January 15, 1951, will encompass a thorough study of the VA Central Office in Washington, district offices, regional offices, centers, and hospitals in field locations.

All phases of the VA's operations will be included in the scope of the study.

NEW NAVY SURGEON GENERAL

On January 29, 1951, Rear Admiral Herbert Lamont Pugh, MC, USN, was sworn in as 25th Chief of the Navy's Bureau of Medicine and Surgery, succeeding Rear Admiral C. A. Swanson. He is the twenty-first to hold the title of Surgeon General of the Navy, and the second Surgeon General to have been appointed while serving as the Deputy Surgeon General. The term is for 4 years.

He received his medical degree from the University of Virginia in 1923, and was commissioned Lieutenant (jg) in the Navy Medical Corps the same year. On December 2, 1946, Admiral Pugh was appointed by the President as the Deputy and Assistant Chief of the Navy Bureau of Medicine and Surgery, and on December 22, 1950, he was nominated by the President to be Surgeon General and Chief of the Bureau of Medicine and Surgery. The nomination was confirmed by the Senate to date from January 27, 1951.

CIVIL DEFENSE

On January 25, 1951, Civil Defense Administrator Millard Caldwell called upon the Governors of the forty-eight States, Alaska, Hawaii, Puerto Rico, the Virgin Islands and the Commissioners of the District of Columbia to take steps by March 1 which would place civil defense activities throughout the nation on a firm footing.

In his message, Mr. Caldwell urged that the following steps be taken, if they have not been accomplished:

1. The passage of adequate state civil defense legislation

2. The appointment of a thoroughly competent, full-time civilian director of civil defense, with a capable staff

3. The appropriation of the needed funds for the support of civil defense activities

4. The establishment of an operating civil defense agency in every community in each state and territory, and the District of Columbia.

Mr. Caldwell also asked that by April 1 each state and territory have in full operation a program of recruitment for civil defense volunteers in all categories and that fire and police auxiliaries be fully integrated by that date.

NEW MEDICAL SERVICE CHIEF, PUBLIC HEALTH SERVICE

Dr. Jack Masur, Chief of the Research Facilities Planning Branch at National Institutes of Health, has been appointed Chief of the Bureau of Medical Services, Public Health Service. The appointment, effective February 1, was made by Surgeon General Leonard A. Scheele.

Dr. Masur succeeds Dr. R. C. Williams, who has retired from the Public Health Service after 33 years to become Director of Medical Services for the Georgia Department of Public Health.

In his new post, Dr. Masur will be in charge of the broad medical care program of PHS, which includes twenty-four Marine hospitals and certain other hospital facilities. He will continue to serve in an advisory capacity to NIH until his successor is named.

Dr. Masur entered the Public Health Service in 1943, and has been serving at NIH since 1947. Before that he was Chief Medical Officer of the Office of Vocational Rehabilitation, Federal Security Agency. In World War II he served as Hospital Officer of the U. S. Office of Civilian Defense.

CORRECTION

In the article, "Lobar Pneumonia and the 'Segmental Plane'," by H. G. Grainger, which was published in the January JOURNAL the words "right" and "left" were reversed in the paragraph beginning on line 15 of the first column on page 256. We regret the error.

GRADUATE COURSES

Graduate School of the College of Osteopathic Physicians and Surgeons.—General Medicine, March 26-April 20. Cardiology, April 23-May 4. Address M. H. Simmers, D.O., associate dean, 1721 Griffin Ave., Los Angeles 31.